ALLEGHENY NATIONAL FOREST

GYPSY MOTH SPRAY PROJECT-1985

--FINAL REPORT--

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United States Department of Agriculture | Forest Service | NA | MFO

Reply to: 3460 Technical Assistance

March 6, 1986

Subject: 1985 Gypsy Moth Spray Project Allegheny National Forest - Final Report

To: Forest Supervisor,
Allegheny National Forest

A comprehensive final report of the 1985 Gypsy Moth Spray Project on the Allegheny National Forest has been prepared.

You will find three copies enclosed for Timber, Recreation and Planning Staffs at your Office. A copy also has been sent to each of the four District Rangers on your Forest, and the Regional Forester through his Timber Management Staff.

We will continue to keep you informed about the current gypsy moth outbreak on your Forest and its consequences to the forest resources there during 1986.

ALLAN T. BULLARD
Field Representative
Forest Pest Management

cc: AO, FPM
District Rangers: Bradford, Marienville, Ridgway, Sheffield
R-9, TM, Attn: Van Aken

limited amount of observation was made by ground personnel. The limited use of spray cards indicated that coverage was generally good for both insecticides. No attempt was made to use cards to determine how uniform coverage was within the spray blocks or the consistency of droplet size to the VMD determined during calibration and characterization.

Spray Volume - The amount of spray discharged from the spray system over the spray areas was monitored daily during the spray operation by comparing for each spray block the expected load manifest against the actual helicopter loading records. The amount of material sprayed was within five percent (5%) of the desired application rate per acre (refer to Appendix Table 4).

Spray Block Location

Marking - The primary marking device was helium-filled weather balloons tethered with strong cotton string allowing the balloon to float within about 30 feet above the canopy. The location of the marking balloon was designated on the maps and aerial photographs and ground crews marked the locations where balloons were to be tethered at the time of spraying. Because balloons were not always placed in the exact corner of the designated area, the pilot had to determine the boundary of the block using natural landmarks for orientation. In a few cases, helium-filled balloons were not at the exact place within a block when the spraying began because of unforseen problems with overhead electric and telephone wires, access problems or field crew logistics the morning of spraying. Spray pilots compensated for these temporary problems by using the aerial photographs and an orientation flight such that applications observed from the chase plane were deemed to be adequate.

Communications

Forest Service - There was one Forest Service radio communications system used during the project which: 1) monitored air to ground radio transmissions from the monitoring aircraft to link up with the Project Coordinator/Project District Inspectors at each helispot during aerial spray operations; 2) a ground to ground radio network for those ground support activities of spray timing, spray area marking, spray deposition sampling, and post-treatment evaluation. An FPM Radio System from BIFC, which would have satisfied the air to ground radio network needs of the Project and supplement the Allegheny National Forest ground to ground established radio network, proved to be inadequate when antennas could not be placed at all the Forest repeaters throughout the ANF, and personnel to operate the base station could not be spared.

Helicopter Systems, Inc. - Contractor provided his own radio communication network using a different frequency than the Forest Service to link up between the helispots and the helicopters while in flight, to include ferry flights and periods of application of insecticide.

Pesticide Handling and Disposal

Contractor Responsibility - Contractor was responsible for handling and transporting all insecticide in full, unopened drums securely mounted in a portion of the truck bed to the helispots. At the helispots the insecticide containers and tank mix were to be handled in a safe and judicious manner. Additionally, the Contractor disposed of all empty Dimilin containers and unused Dimilin which he had purchased under the contract in a manner consistent with the label. A problem arose with the disposal of unused B.t. and empty B.t. containers which the USDA, FS, FPM provided to the contractor in order to reduce the cost of the project. As of January 1, 1986, eight empty containers and 2 containers containing 85 unused gallons of B.t. still remained stored at Sheffield Ranger District. Efforts have been made to excess this material.

The District Inspectors did not report any pesticide spills or aircraft incidents during the project. The contractor had a plan, and the equipment and materials available for containing ground spills, cleaning them up and disposing of the contaminated soil and debris safely and properly in accordance with the label for each insecticide used on this project.

Before their disposal, emptied liquid containers were rinsed 3 times using a volume of water equal to approximately 20% of the containers capacity. The rinse liquid was disposed of by adding it into the total spray mixture.

PUBLIC INFORMATION AND NOTIFICATION

People occupying developed recreation sites scheduled for aerial spraying were notified about the intent to spray, and by posting signs along roads bordering the spray block several days preceding treatment, so that the general public could stay out of the area during spraying. Allegheny National Forest campgrounds were closed during the spraying. The use of radio and press releases were also made to keep any interested people informed about spray schedules and completions.

SAFETY

Helicopter use at low altitudes over densely forested and hilly terrain, and mixing/loading at remote helispots presented special problems for the Contractor, Forest Service and general public. During air operations, the Contractor was expected to:

1. Operate his equipment in a manner to protect life and health and to prevent property damage and use due diligence in preventing accidents and comply with applicable Federal and State laws.

2. The Contractor was expected to fully cooperate in any investigation, and provide any needed records, statements, or parts in any investigation of an accident related to this contract. These records were to be made available upon request of the Contracting Officer.

3. In the event of a major accident, all wreckage and equipment which might be involved in the accident were to be under the exclusive control of

the Forest Service, or other persons or agencies so designated by the Forest Service, for the duration of the investigation and until released by the Contracting Officer, unless otherwise provided for in applicable Federal Statutes.

During ground operations, the Contractor was to:

1. Provide other equipment, such as but not limited to, support equipment, service equipment, and administrative equipment needed to perform the aerial spraying in a safe manner. Contractor was responsible for security of helicopters and all equipment and materials needed for their operation.

2. Any personnel exposed to Dimilin 25W dust during mixing were to be provided with a mask equipped with filters to reduce inhalation of airborne particulates. Mask or respirators designed for filtering out dust were considered adequate. Also, persons handling the open containers were to wear rubber gloves and boots and eye protection.

The Allegheny National Forest assigned to Ron Cristy the responsibility of preparing a project safety plan, training personnel on how to conduct themselves in a safe manner especially in the vicinity of the spray aircraft and support equipment. He was to investigate and report on any aircraft incident involving personal injury or property damage and any insecticide spill or dump causing environmental or human health concern to the Regional Air Officer and the Regional Safety Officer.

PROJECT PROGRESS, ACCIDENT AND INCIDENT REPORTING

Daily reports were provided to the Project Coordinator. A brief report on acreage treated by each insecticide during the day and acreage planned for treatment the next day were made to FPM, Morgantown. The amounts of each insecticide sprayed each day are shown in the Spray Record (refer to Appendix Table 6).

Insecticide spills and dumps either on the ground while transporting, mixing and loading or from the air during an emergency were to be reported to the Forest Service Project Coordinator or his representative and forwarded to R-9 Regional Office and FPM, Morgantown. The report would normally include: 1) insecticide involved; 2) whether diluted or undiluted; 3) estimated amount; 4) location on a map; 5) date and time; 6) person responsible; 7) method used to contain ground spills; 8) cleanup date and method; 9) contaminated debris disposal date and method.

No pesticide spills or dumps, accidents, or incidents by the Contractor were reported by the Project Coordinator.

POST-TREATMENT EVALUATION

Foliage Protection

The effectiveness of the aerial application of Dipel 8L and Dimilin 25W in meeting the project objective of reducing gypsy moth defoliation was evaluated using color infrared aerial photography obtained from R-8, FPM-Aerial Survey Team under the supervision of Denny Ward. Visual observations at ground sites within and outside of spray blocks, and during aerial sketchmapping, provided ground truth as to causal agent and and a first approximation of the extent of defoliation. Appendix Table 2 shows the actual defoliation class and its acreage within each spray block.

On May 31, 1985, northwestern Pennsylvania was subjected to one of the worst tornadoes ever reported there. Two tornadoes cut swaths, which were up to a mile wide in places, completely across the Allegheny National Forest. Portions of three spray blocks totalling 402 acres were destroyed by these tornadoes.

Additionally, the average defoliation class was determined from aerial photography for each of the Entomological Areas (refer to Appendix Table 7). To determine the defoliation which developed in stands with very dense gypsy moth populations (here called "hot-spots) originally considered for treatment but deferred for economic reasons, aerial photography was interpreted and compartments containing such areas were classed for the defoliation which occurred (refer to Appendix Table 9).

Excellent foliage protection from gypsy moth feeding was achieved with each spray material. Diflubenzuron provided virtually total foliage protection within its spray blocks and only 1.4% of the B.t. spray acreage experienced moderate (30-60%) defoliation.

Gypsy Moth Population Reduction

Spray efficacy for each insecticide used, in terms of gyspy moth population reduction, was determined by comparing the change in mean egg mass density per acre from the treatment generation to that following within and outside of the spray blocks in each entomological area. Appendix Table 7 compares the change in egg mass density between 1984 and 1985.

Treatment effects on gypsy moth populations using egg mass density changes between the treated and next generation showed different results depending upon material used. Within the B.t. treated spray blocks, populations increased by 58% compared with a 330% increase in densities in adjacent unsprayed areas. Since foliage protection was achieved within the B.t. blocks, adequate population reduction must have occurred within the generation treated. However, the resurgent gypsy moth populations found in the spray blocks after the egg laying period must have come from late-instar larvae migrating from the eruptive populations nearby the relatively small spray blocks.

Diflubenzuron provided more effective suppression of gypsy populations by reducing them an average of 86% within spray blocks compared to a 7% increase in adjacent unsprayed areas.

Natural factors also influenced gypsy moth population change. Sampling in late May, after spraying had ended, showed that about 26% of all egg masses failed to hatch at all and only partial hatch was observed in another 37% (refer to Appendix Table 8). Also, there were differences in egg mass hatch at three heights on tree boles, indicating that the egg mortality may be attributed to abnormally warm temperatures (70 to 79°F) in early winter followed by a sustained 6-8 week period of extremely cold temperatures (-20 to- 25°F).

Future Trend

The outbreak which defoliated only 2,024 acres in 1984 and increased to 9,642 acres in 1985, is expected to enlarge in 1986. The oak forest type covers about 100M acres of Allegheny National Forest lands, but only about half of this area has the potential for moderate to severe defoliation this coming summer. Preliminary data indicates that about 19,000 acres of high-value, high-use forest would be affected by defoliation and subsequent tree mortality.

PROJECT BUDGET

The project expenses totaled $171,869 for Fiscal Year 1985 which was financed through FPM, WO. This total was based on contracting services associated with aerial application ($85,669), field support during planning and conduct of the project by the Allegheny National Forest and R-9 Regional Office personnel ($31,000) and FPM, Morgantown, technical support and monitoring ($55,200). Refer to Appendix Table 10 for a detailed presentation of project costs.

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SUMMARY

During 1985, the first large-scale gypsy moth suppression project on a National Forest took place on the Allegheny National Forest located in northwestern Pennsylvania. The decision to treatment the gypsy moth infestation with insecticides applied in selected areas of the Forest was fully supported by an Environmental Assessment, tied into a national USDA Environmental Impact Statement. The results of the spray project as presented in this report have been summarized below.

Insecticide, Spray Acreage and Cost - A total of 10,477 acres was aerially treated using 66 spray blocks. Bacillus thuringiensis or B.t., formulated as Dipel 8L, was applied to 1,486 acres at a rate of 20 BIU in 1 gallon of mix per acre. The sticker Plyac was mixed with B.t. at the rate of 2% of total volume. Diflubenzuron, formulated as Dimilin 25W, was applied to 8,991 acres at a rate of 1/2 ounce active ingredient in 1 gallon of mix per acre. Spraying was done between May 16 and 21, 1985, using two helicopters, a Bell 204B, and Bell 206B. Cost of material and application was $12.31/ac for the Dipel 8L spraying and $7.75/ac for Dimilin 25W.

Treatment Results - Based on foliage protection, excellent gypsy moth suppression was achieved with each spray material. Diflubenzuron provided virtually total foliage protection within its spray blocks and only 1.4% of the B.t. spray acreage experienced moderate (30-60%) defoliation.

An assessment of treatment effects on gypsy moth populations used egg mass density changes between the treated and next generation. Within the B.t. treated spray blocks, populations increased by 58% compared with a 330% increase in densities in adjacent unsprayed areas. Since foliage protection was achieved within the B.t. blocks, adequate population reduction must have occurred within the generation treated. However, the resurgent gypsy moth populations found in the spray blocks after the egg laying period must have come from late-instar larvae migrating from the eruptive populations nearby the relatively small spray blocks.

Diflubenzuron provided more effective suppression of gypsy moth populations by reducing them an average of 86% within spray blocks compared to a 7% increase in adjacent unsprayed areas.

Natural factors also influenced gypsy moth population change. About 25% of the egg masses failed to hatch at all and only partial hatch was observed in another 37%. The egg mortality may be attributed to abnormally warm temperatures (70 to 79°F) in early winter followed by a sustained 6-8 week period of extremely cold temperatures (-20 to -25°F).

Future Trend - The outbreak which defoliated only 2,024 acres in 1984 and increased to 9,642 acres in 1985, is expected to enlarge in 1986. The oak forest type covers about 100M acres of Allegheny National Forest lands, but only about half of this area has highly susceptible forest tree species and conditions with a high potential for moderate to severe defoliation this coming summer. Within this area of high defoliation potential, no more than about 19,000 acres of high-use, high-value stands are threatened by the outbreak.

INTRODUCTION

The gypsy moth, Lymantria dispar L., reached epidemic population densities on the Allegheny National Forest, Pennsylvania, within the last two years. This outbreak was detected during the 1984 aerial detection survey when moderate to severe defoliation was observed on about 2,024 acres in the southern portion of the Forest. Subsequent egg mass surveys during the autumn of 1984 indicated that the outbreak had the potential to cause moderate to severe defoliation on about 40% of the nearly 100,000 acres of oak forest type during 1985. Working with the ANF Supervisor's Office and Ranger Districts affected, 10,477 acres of high value recreation and timber forests were identified for protection from this outbreak. A total of 1,486 acres was aerially treated with B.t. (under the trade name Dipel 8L) and 8,991 acres with diflubenzuron (under the trade name Dimilin 25W). The suppression project was jointly conducted by R-9, Allegheny National Forest and NA, Forest Pest Management personnel. This report presents detailed information about all aspects of the project.

Intent and Scope of the Report - This report presents: 1) project objectives; 2) organization and responsibilities of key Forest Service and contract personnel; 3) operational aspects of mixing and loading the insecticides; 4) observations of weather during spraying; 5) monitoring made of actual spraying; 6) the results of spraying on gypsy moth populations and the foliage of their hosts; 7) budgetary requirements; 8) spray block location information; 9) the featured forest resource management goal and actual infestation which occurred for each spray block; 9) detailed financial statements. The details for many of these items are presented in the Appendix Exhibits.

Project Objectives - Through the aerial application of Dipel 8L and Dimilin 25W, the Forest Service intended to: 1) prevent gypsy moth defoliation of forest trees in selective spray blocks from reaching the moderate (30-60%) defoliation class; 2) reduce gypsy moth populations by at least 90% between the treated and next generation. Achievement of Objective 1 was assessed through defoliation estimates within and adjoining spray blocks using color infrared aerial photography. Objective 2 was assessed by comparing the change in pre-treatment to post-treatment egg mass densities between sprayed and unsprayed survey plots within Entomological Areas treated with each material. Entomological Areas were groupings of timber compartments within a Ranger District selected because of their similarities of physiography and administrative control.

Environmental Considerations - The decision to apply insecticides against the gypsy moth in selected areas of the Forest was fully supported by an Environmental Assessment, tied into the 1985 USDA Environmental Impact Statement. Public involvement played a key role in the EA from the development of key issues, concerns and opportunities related to the proposed suppression alternatives through the public comments about the decision to spray selected areas of the Forest.

ORGANIZATION AND RESPONSIBILITIES

The project organization for Forest Service and Contractor personnel is shown in the following hierarchical outline:

Allegheny National Forest Supervisor - R. Forrest Carpenter

Project Coordinator - Porter Gearhart, ANF-SO

Spray Timing and Area Marking Personnel

- Project Entomologist - Bob Acciavatti, FPM-MFO
  - Field Activities Coordinator - Don Soctomah, FPM-MFO
    - Insect/Foliage Development and Spray Deposition Field Crews
    - Spray Area Marking Field Crews

Spray Applications Personnel

- Air Operations Advisor - Bob Acciavatti, FPM-MFO
- Project Safety - Ron Cristy, ANF-SO
- Project Weather - Carl Jablonowski, ANF-Bradford RD
- Project Communications - Marge Raught, ANF-Marenville RD Dispatcher
  Diane Lobdell, ANF-SO

Spray Mixing and Loading Personnel

- Project District Inspectors - Mike Beige, ANF-Bradford RD
  - Joe Heppinger, ANF- Marienville RD
  - Rod Morley, ANF-Sheffield RD

Helicopter Systems, Inc., Contractor Helispot Operations Personnel

- Helicopter Pilot (David Marks) and Ground Support Crew (3 people) for one Bell 206B (FAA-N503W)
- Helicopter Pilot (Jim Lawrence) and Ground Support Crew (3-4 people) for one Bell 204B (FAA-N4580Y)

The Forest Service furnished personnel functioned in the following capacities to coordinate and direct the spray operations. It is apparent from the previous organizational heirarchy, that one individual operated in more than one of the the following capacities:

Project Coordinator - Porter Gearhart, Allegheny National Forest (ANF) Supervisor's Office. Responsible for the overall coordination of the field operations. Represented the Forest Service as COR in settling minor contractual matters. Suggested helispot locations. Responsible for inspection of all helicopter and pilot logs to insure Contract compliance. Briefed the pilots concerning spray order and any special conditions in the spray area. Usually assisted by an inspector/record keeper from each RD.

Aircraft Operations Advisor - Bob Acciavatti, Forest Pest Management Morgantown Field Office (FPM, MFO). Supervised the calibration before spraying, scheduled spray block order, and conducted spray monitoring from a chase plane approved for Forest Service use.

Project District Inspectors - The following ANF individuals from their respective Ranger District (Bradford RD - Mike Behe; Marienville RD - Joe Heppinger; Sheffield RD - Rod Morley) were knowledgeable of aircraft operations and acted as inspector/record keepers for one helicopter working from one or more helispots during the project. Notified the Project Coordinator concerning any changes from previous plans or operational problems and provided daily reports of the field operations to Project Coordinator.

Project Entomologist - Bob Acciavatti, FPM, MFO. Planned and supervised gypsy moth population sampling in Entomological Areas and released Gypsy Moth Development Units for treatment. Entomological Areas were groupings of timber compartments within a Ranger District selected because of their similarities of physiography and administrative control. Gypsy Moth Development Units were groups of Entomological Areas which were expected to have nearly the same start of egg hatch and progress of larval development because of relatively similar landform.

Field Activities Coordinator - Don Soctomah, FPM, MFO. Coordinated and directed the activities of all field crews sampling for insect development, tree foliage expansion, spray efficacy, spray area marking and monitoring. Consulted the Project Entomologist or Project Coordinator daily concerning any changes from previous plans.

Project Weather - Carl Jablonowski, ANF. Compiled NOAA Weather Service short- and long-term forecasts of meterological conditions over spray areas and coordinated on-site measures of wind speed, air temperatures and general meterological conditions during spraying.

Project Safety - Ron Cristy, ANF. Prepared project safety plan, trained personnel on how to conduct themselves in a safe manner especially in the vicinity of the spray aircraft and support equipment. Investigated and reported to Regional Air Officer and Regional Safety Officer on any aircraft incident involving personal injury or property damage and any insecticide spill or dump causing environmental or human health concern.

Project Communications - Forest Dispatcher at Marienville, RD, with assistance from ANF-SO monitored, relayed and logged radio transmissions for the project between Project Coordinator, Air Operations Advisor and

District Inspectors to ensure that a radio-telephone linkage existed for handling all situations including emergencies.

Field Crews - ANF and FPM personnel needed for technical field activities of insect development sampling, spray area marking with balloons, spray deposition sampling with cards, etc. Normally, 2, two-person crews, each equipped with a radio, were assigned to each helicopter during spraying.

OPERATIONAL CONSIDERATIONS

Insecticide Application

Dipel 8L was applied at the rate of 20 BIU (billion international units) in 128 ounces of total formulation per acre. The spreader-sticker "Plyac" was added to the Dipel 8L at the rate of 2% by volume to extend its residual activity. Dimilin 25W was applied at the rate of 2 ounces of wettable powder in 128 ounces of water per acre, giving 1/2 ounce of active ingredient per acre.

Spray Block Selection

The 8 spray blocks of Dipel 8L and 58 blocks of Dimilin 25W totaled 10,477 acres (Appendix Tables 1 and 2 show their locations and characteristics). All of these blocks had the highest valued developed recreational sites and red oak timber stands thinned within the last five years or planned for thinning orregeneration cuts within the next five years. All spray blocks were threatened by the gypsy moth and had the highest priority for treatment. The boundaries of each spray block have been delineated on 7.5 minute forest ownership quad maps (refer to Maps 1 through 20) and on 1980 black and white aerial photographs (1:15840 scale)(available at FPM, Morgantown, WV, and ANF-SO, Warren, PA).

Application Equipment

Helicopters - Each of the helicopters mentioned below was equipped with a spray distribution system designed to produce small droplets (as defined below) and distribute these droplets uniformly over a specified operational swath pattern.

The Bell 206B and the Bell 204B helicopters under contract for this spray project achieved an average daily production quota of 1,746 acres of spraying based on the maximum acreage of 10,477 acres divided by 6 days of actual spraying during the spray window. This exceeded the daily average of 960 acres expected for the project to remain on schedule. The requirement to at least meet this average daily production quota was essential because of: 1) the uncertainty of inclement weather over the areas during the spray window; 2) the scattered nature of treatment areas; 3) down time from other unpredictable factors.

The actual spray load and hourly production rate for the helicopters used in the project were as follows:

Helicopter Type	Minimum Horsepower	Average Spray Load (Gallons)	Average Production (Acres/Hour) Dimilin	B.t.
Bell 206B	400	82.6	351	396
Bell 204B	800	262.5	576	---

Spray System - Each helicopter was equipped with an approved standard spray boom system of the type most commonly employed in aerial applications as discussed in the following specifications:

Nozzle Specifications - All nozzles were new and used stainless steel nozzles 8004 flat flan type.

Spray Boom - This had the capability of being rotated and plumbing provided to allow orientation of nozzle tips forward in order to take advantage of wind shear to assist breaking up and dispersion of droplets.

Boom Pressure - Pumps was capable of producing and the entire system was capable of sustaining pressure of 40-65 PSI.

Spray Tanks - Leakproof corrosion-resistant tanks with exterior filler openings were used. The location and size of tanks did not impair air-worthiness by overloading or displacing the center of gravity beyond acceptable limits. Filler openings or neck were large enough to prevent surging during filling and tanks were vented to the outside of the fuselage.

Calibration and Characterization

On the evening of May 14, 1985, at a large open field near Loleta Campground, Forest Pest Management, MFO, calibrated and characterized the helicopter spray systems of the Bell 206B and Bell 204B at the expense of Helicopter Systems, Inc., using water with red food coloring and standard procedures. Each helicopter spray system had the following specifications:

Droplet Size - The 8004 flat fan tips on each aircraft would ideally produce droplet sizes of 150 microns VMD (Volume Median Diameter). In fact, on each of three trials, the Bell 206B produced droplets with a VMD of 324, 496 and 398 microns, and on two trials, the Bell 204B produced droplets with a VMD of 177 and 287 microns as determined by standard techniques (1).

Delivery Rate - Delivery was set at one (1) gallon (128 oz.) per acre for each insecticide.

Swath Width - Spray swath width for each helicopter was determined to be 80 feet for the Bell 206B and 120 feet for the Bell 204B.

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(1) Barry, J.W., et al. 1978. Methods for sampling and assessing deposits of insecticidal sprays released over forest. USDA Technical Bulletin 1596. 162pp.

Operational Conditions

Spray Timing - Release of areas for spraying depended upon insect development and tree foliage expansion within each of the seven Gypsy Moth Development Units shown in Appendix Table 3. Dipel 8L was applied to blocks in Units I, III, VII when foliage had reached one-fourth to one-third of its normal size on the most prevalent oak species present, and the majority of gypsy moth larvae on that foliage were in the second and third instars. Dimilin 25W spraying in the remainder of the Units likewise followed the same rule for foliage expansion, but treatment was to begin as early as the time when 50% of the larvae on that foliage had reached the second instar.

The following conditions of insect development and tree foliage expansion existed on May 12, 1985, when the spray blocks were released for spraying in the order indicated:

	Gypsy Moth Development Unit Number						
	I	II	III	IV	V	VI	VII
Spray Release Sequence	1st	2nd	3rd	4th	6th	5th	7th
% Egg Hatch	41	38	47	50	47	29	39
% 2nd/3rd Instar	78	77	79	78	91	78	35
Foliage Expansion	36	37	44	14	68	7	26

Spraying began within a Gypsy Moth Development Unit only after it had been released by the Forest Service Project Entomologist.

All spray blocks/areas within a Development Unit were released simultaneously with their scheduling determined by the Forest Service's Contracting Officer's Representative (C.O.R.), in consultation with the Contractor's Project Coordinator.

Spray Schedule - Spraying began on May 16, 1985, as dictated by insect development and tree foliage expansion data obtained during the previous 4 to 6 days. The spray record, showing actual spray times and gallons sprayed for each helicopter for each day within each spray block and insecticide, is presented in Appendix Table 4. All spraying was completed on May 21, 1985.

Weather Restrictions - The Forest Service's C.O.R., or in his absence his designate, determined when spraying operations were prohibited. Information supplied by the field crews and an Air Operations Advisor in a monitor aircraft were used in making these decisions. The following spray area conditions were used as guidelines in suspending spray operations:

* Wind velocity exceeding ten (10) miles per hour at ground level.
* During rain or foggy weather, or when the foliage was dripping wet, or when there was an imminent threat of rain within four hours.

* When air turbulence (thermal updrafts, etc.) was so great as to seriously affect the normal spray pattern, or causes disruption of helium-filled marking balloons. Generally, thermals do not develop until the temperature goes above 80 degrees F.
* When in the opinion of the Forest Service, the spray material would not effectively reach the intended target.

The general weather conditions during the 6 day spray period and those occuring during and shortly after spray activity are in Appendix Table 5.

Spray Days - The intention of the Forest Service was to spray six-days per week during the spray window whenever conditions were acceptable. Indeed, spraying extended over the weekend of May 18-19, since support personnel showed little or no fatigue. Weekend and holiday spraying was not permitted in developed recreation areas and every attempt was made to complete the spraying before the Memorial Day holiday weekend.

Evening Spraying - The spray record (refer to Appendix Table 4) substantiated data from previous spray projects which indicated that acceptable spraying conditions in the evening generally last no more than 2 hours. Although the primary productive spray time was in the early to midmorning hours of daylight, favorable spray conditions existed during the evenings of May 16, 19, and 20, and up until early afternoon on May 21. Planning this evening spraying right from the start of the project when conditions were ideal was helpful in keeping on schedule.

Special Precautions

Designated Areas - Observation of the spraying from a high-wing Cessna 172 and 182, showed that application of the spray material was confined, as much as operationally possible, to the designated areas. Within these areas the spray was applied to the forest canopy of mature trees and in a few cases to smaller trees in old clear cuts within the spray block. Where observed, spraying was shut off over open fields and all open bodies of water. The majority of the treatment areas were forested.

Turns - The spray was shut off at the end of spray runs and during the time when a turning to start another pass. Turns at the end of spray runs generally avoided open water bodies such as lakes, rivers, ponds or private property.

Application Monitoring

Accuracy - About 25% of the B.t. and 47% of the Dimilin spray acreage were monitored for accuracy by Bob Acciavatti, FPM, using a Cessna 172 and 182 chase plane at a cost of 78 cents per observed acre. The portion of each spray block which was monitored is presented in Appendix Table 6. A much more

APPENDIX TABLE 1

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - LOCATION OF B.t. SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	SPRAY BLOCK ID	RANGER DIST	DEVELOPED REC. SITE NAME	NET ACRES	USGS 7.5' QUAD	1980 PHOTO REF
I	A	M	Loleta	143	M'ville East	19,480-10
Subtotal	1			143		
VII	B	B	Willow Bay	236	Corn.Run, PA	25,680-63 26,680-71
	C	B	Hook's Brook	100	Corn.Run, PA	25,680-60
	D	B	Tracy Ridge	228	Corn.Run - Stickney	27,1080-133 28,1080-129
	E	B	Handsome Lake & Hopewell	212	Corn.Run, PA	25,680-56
	F	B	Rimrock	43	Corn.Br., PA	24,580-215 25,680-49
	G	B	Morrison	87	Corn.Br., PA	25,680-47
Subtotal	6			906		
Rec. Site Total	7			1049		

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	NET ACRES	USGS 7.5' QUAD	1980 PHOTO REF
III	H	M	2 - 1	437	West Hickory	4,180-52 5,180-90
B.t. Grand Total	8			1486		

APPENDIX TABLE 1 (Cont'd.)

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - LOCATION OF DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	NET ACRES	USGS 7.5' QUAD	1980 PHOTO REF
I	7	M	92-1	59	M'ville East	22,580-121
	8	M	92-2	137	Hallton/M'vl E.	22,580-121
	9	M	105-1	131	Hallton	23,580-133 24,580-261
	10	M	105-2	118	Hallton	23,580-132 24,580-262
	11	M	105-3	122	Hallton	23,580-133
	12	M	106-1	82	Hallton	23,580-133 24,580-261
Subtotal	6			649		

APPENDIX TABLE 1 (Cont'd.)
ALLEGHENY NATIONAL FOREST
1985 GYPSY MOTH SUPPRESSION - LOCATION OF DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	NET ACRES	USGS 7.5' QUAD	1980 PHOTO REF
II	13	M	20-1	318	Tylers/M'vl W.	11,280-85 12,280-94
	14	M	21-1	48	Tylers	10,280- 7 11,280-83
	15	M	21-2	490	Tylers/Kellet.	10,280- 8 10,280-10
	16	M	22-1	135	Kelletville	10,280-10
	17	M	23-1	160	Kellet/Mayburg	11,280-79 11,280-80
	18	M	23-2	281	Kelletville	10,280-11 11,280-80
	21	M	24-2	109	Kellet/Mayburg	11,280-79 11,280-80
	22	M	24-3	78	Mayburg	12,280-98
	23	M	25-1	147	Tylers/M'vl W.	11,280-83 12,280-95
	24	M	28-1	409	Mayb'g/M'vl W.	12,280-98 13,280-172
	25	M	28-2	86	Marienville W.	12,280-95 13,280-174
	26	M	28-3	50	Marienville W.	12,280-95
	27	M	28-4	52	Marienville W.	12,280-95
Subtotal	13			2363		

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	NET ACRES	USGS 7.5' QUAD	1980 PHOTO REF
III	31	M	14-1	398	Kelletville	8,180-176 9,180-219
Subtotal	1			398		

APPENDIX TABLE 1 (Cont'd.)
ALLEGHENY NATIONAL FOREST
1985 GYPSY MOTH SUPPRESSION - LOCATION OF DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	NET ACRES	USGS 7.5' QUAD	1980 PHOTO REF
IV	34	S	81-1	100	Cobham	9,180-204 9,180-205
	35	S	81-2	107	Cobham	9,180-205
	36	S	82-2	103	Cobham	8,180-189
	37	S	82-3	36	Cobham	8,180-189
	38	S	82-4	52	Cobham	8,180-189 9,180-205
	39	S	83-1	128	Cobham	7,180,129 8,180-189
	40	S	84-1	186	Cobham	7,180-130
	41	S	131-1	112	Tidioute/Cobham	6,180-119 6,180-120
	42	S	131-2	41	Tidioute	6,180-119 6,180-120
	43	S	131-3	57	Tidioute	6,180-118 6,180-119
	44	S	131-4	89	Tidioute	6,180-118
	45	S	132-1	75	Cobham	6,180-119 6,180-120
Subtotal	12			1086		

APPENDIX TABLE 1 (Cont'd.)
ALLEGHENY NATIONAL FOREST
1985 GYPSY MOTH SUPPRESSION - LOCATION OF DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	NET ACRES	USGS 7.5' QUAD	1980 PHOTO REF
V	46	S	89-1	278	Cherry Grove	12,280-114
	47	S	118-1	369	Cherry Grove	14,380- 24
	48	S	119-3	187	Cherry Grove	14,380- 24
	49	S	121-2	178	Cherry Grove	12,280-111
	50	S	137-1	145	Kellet/Cobham	10,280- 20 10,280- 22
	51	S	138-2	565	Kellet/Cobham	10,280- 20 11,280- 69
	52	S	139-1	143	Cherry Gr/Maybg.	12,280-109 12,280-111
	53	S	140-1	590	Cob/Kellt/Maybg.	11,280- 69 12,280-108
	54	S	144-1	92	Kellet/Mayburg	11,280- 72 12,280-108
	55	S	144-2	482	Kelletville	10,280- 17 11,280- 73
	56	S	145-1	81	Kellet/Mayburg	11,280- 72 12,280-108
	57	S	145-2	84	Kelletville	11,280- 71 11,280- 72
	58	S	145-3	50	Kelletville	10,280- 18 11,280- 72
Subtotal	13			3244		

APPENDIX TABLE 1 (Cont'd.)

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - LOCATION OF DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	NET ACRES	USGS 7.5' QUAD	1980 PHOTO REF
VI	65	S	5-1	201	Warren	12,280-128 13,280-140
	66	S	7-1	73	Warren	13,280-140 14,380- 42
	67	S	7-2	42	Warren	13,280-140 14,380- 42
	68	S	7-3	45	Warren	13,280-140 13,280-141
	69	S	9-1	42	Warren	16,380-100 17,380-110
	70	S	9-2	102	Warren/Clarendn.	17,380-110
	71	S	9-3	123	Clarendon	17,380-110 17,380-111
	72	S	9-4	53	Clarendon	17,380-110 17,380-111
	73	S	18-1	191	Warren/Clarendn.	17,380-113
	74	S	19-1	62	Warren	16,380- 97
	75	S	19-2	22	Warren	16,380- 97
	76	S	19-3	39	Warren	16,380- 96
	77	S	29-1	256	Warren	13,280-145 14,380- 37
Subtotal	13			1251		
Dimilin Grand Total	58			8,991		

APPENDIX TABLE 2

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - CHARATERISTICS OF SPRAY BLOCKS

B.t. SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	ENTOMOL. AREA ID	RANGER DIST	REC. SITE NAME	ANF MGT GOAL(1)	1985 DEFOLIATION (2) PREDICTED CLASS	ACTUAL CLASS (%)
I	A	M	Loleta	7	L#	L (100)
Subtotal	1					
	B	B	Willow Bay	7	M	L (89) M (11)
	C	B	Hook's Brook	7	M	L (98) M (2)
	D	B	Tracy Ridge	7	M	L (97) M (3)
	E	B	Handsome Lake & Hopewell	7	M	L (99) M (1)
	F	B	Rimrock	7	M	L (100)
	G	B	Morrison	7	M	L (100)
Subtotal	6				M	L (98) M (2)
Rec. Site Total	7				M	L (98) M (2)
III	H	M	2 - 1	3	M	M *52% DAMAGED BY TORNADO*
B.t. Grand Total	8				M	L (99) M (1)

(1) 3 = Timber; 7 = Developed Recreation

(2) L = <30 %; M = 30-60 %

= High Potential for Larval Blow-in

APPENDIX TABLE 2 (cont'd.)

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - CHARACTERISTICS OF SPRAY BLOCKS

DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	ANF MGT GOAL (1)	1985 DEFOLIATION (2) PREDICTED CLASS	ACTUAL CLASS
I	7	M	92-1	3	L#	L
	8	M	92-2	3	L#	L
	9	M	105-1	3	L#	L
	10	M	105-2	6.1	L#	L
	11	M	105-3	3	L#	L
	12	M	106-1	3	L#	L
Subtotal	6				L#	L

(1) 3 = High Value Timber; 6.1 = Wildlife Habitat.
(2) L = <30 %; M = 30-60 %; S = >60 %
= High potential for larval blow-in.

APPENDIX TABLE 2 (Cont'd.)

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - CHARACTERISTICS OF SPRAY BLOCKS

DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	ANF MGT GOAL	1985 DEFOLIATION PREDICTED CLASS	ACTUAL CLASS
II	13	M	20-1	3	M	L
	14	M	21-1	3	M	L
	15	M	21-2	3	M	L
	16	M	22-1	3	M	L
	17	M	23-1	3	M	L
	18	M	23-2	3	M	L
	21	M	24-2	3	M	L *6% DAMAGED BY TORNADO*
	22	M	24-3	3	M	L
	23	M	25-1	3	M	L
	24	M	28-1	3	M	L
	25	M	28-2	3	M	L
	26	M	28-3	3	M	L
	27	M	28-4	3	M	L
Subtotal	13				M	L

APPENDIX TABLE 2 (Cont'd.)

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - CHARACTERISTICS OF SPRAY BLOCKS

DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	ANF MGT GOAL	1985 DEFOLIATION PREDICTED CLASS	ACTUAL CLASS
III	31	M	14-1	3	S	L
Subtotal	1					
IV	34	S	81-1	3	M	L
	35	S	81-2	3	M	L
	36	S	82-2	3	L#	L
	37	S	82-3	3		L#
L						
	38	S	82-4	3	L#	L
	39	S	83-1	3	L#	L
	40	S	84-1	3	L#	L
	41	S	131-1	3	L#	L
	42	S	131-2	6.1	L#	L
	43	S	131-3	6.1	L#	L
	44	S	131-4	3	L#	L
	45	S	132-1	3	L#	L
Subtotal	12				L# - M	L

APPENDIX TABLE 2 (Cont'd.)

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - CHARACTERISTICS OF SPRAY BLOCKS

DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	ANF MGT GOAL	1985 DEFOLIATION PREDICTED CLASS	ACTUAL CLASS
V	46	S	89-1	6.1	L#	L *60% DAMAGED BY TORNADO*
	47	S	118-1	3	L#	L
	48	S	119-3	3	L#	L
	49	S	121-2	3	L#	L
	50	S	137-1	3	L#	L
	51	S	138-2	3	L#	L
	52	S	139-1	3	M	L
	53	S	140-1	3	M	L
	54	S	144-1	3	M	L
	55	S	144-2	3	M	L
	56	S	145-1	3	M	L
	57	S	145-2	3	M	L
	58	S	145-3	3	M	L
Subtotal	13				L# - M	L

APPENDIX TABLE 2 (Cont'd.)
ALLEGHENY NATIONAL FOREST
1985 GYPSY MOTH SUPPRESSION - CHARACTERISTICS OF SPRAY BLOCKS

DIMILIN SPRAY BLOCKS

GYPSY MOTH DEV. UNIT	AREA ID	RANGER DIST	COMP.- BLOCK NUMBER	ANF MGT GOAL	1985 DEFOLIATION PREDICTED CLASS	1985 DEFOLIATION ACTUAL CLASS
VI	65	S	5-1	3	M	L
	66	S	7-1	3	M	L
	67	S	7-2	3	M	L
	68	S	7-3	3	M	L
	69	S	9-1	6.1	L#	L
	70	S	9-2	6.1	L#	L
	71	S	9-3	3	L#	L
	72	S	9-4	3	L#	L
	73	S	18-1	3	L#	L
	74	S	19-1	3	L#	L
	75	S	19-2	3	L#	L
	76	S	19-3	3	L#	L
	77	S	29-1	3	M	L
Subtotal	13				L#, M	L
Dimilin Grand Total	58				L#, M, S	L

APPENDIX TABLE 3

ALLEGHENY NATIONAL FOREST - 1985 SUPPRESSION PROJECT

GYPSY MOTH INSECT DEVELOPMENT AND FOLIAGE EXPANSION AS OF MAY 12, 1985

Development Unit I --- Plot Nos. Sampled - 2, 3, 4, 5, 7, 10

Insect Development	Average %	No. of Trees Sampled
Egg Hatch	40.9	50
Instar 1st	21.7	50
2nd	39.6	50
3rd	38.8	50
Foliage Expansion		
White Oak	17.8	25
Red Oak	17.6	19
Other	72.0	5

Development Unit II --- Plot Nos. Sampled - 1, 2, 3, 4, 5

Insect Development	Average %	No. of Trees Sampled
Egg Hatch	37.8	50
Instar 1st	22.3	50
2nd	60.1	50
3rd	16.8	50
Foliage Expansion		
White Oak	26.0	20
Red Oak	31.7	6
Other	51.9	24

Development Unit III --- Plot Nos. Sampled - 2, 5, 6, 9, 11

Insect Development	Average %	No. of Trees Sampled
Egg Hatch	47.4	50
Instar 1st	21.3	50
2nd	48.8	50
3rd	29.9	50
Foliage Expansion		
White Oak	15.6	31
Red Oak	30.3	15
Other	86.6	3

APPENDIX TABLE 3 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 SUPPRESSION PROJECT

GYPSY MOTH INSECT DEVELOPMENT AND FOLIAGE EXPANSION AS OF MAY 12, 1985

Development Unit IV --- Plot Nos. Sampled - 1, 2, 3, 5, 9

Insect Development	Average %	No. of Trees Sampled
Egg Hatch	50.1	50
Instar 1st	21.6	50
2nd	63.8	50
3rd	14.5	50
Foliage Expansion		
White Oak	13.3	27
Red Oak	14.1	23
Other	0.0	0

Development Unit V --- Plot Nos. Sampled - 2, 6, 8, 11, 15

Insect Development	Average %	No. of Trees Sampled
Egg Hatch	46.5	50
Instar 1st	8.7	50
2nd	64.2	50
3rd	27.1	50
Foliage Expansion		
White Oak	55.8	13
Red Oak	68.8	12
Other	79.1	22

APPENDIX TABLE 3 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 SUPPRESSION PROJECT

GYPSY MOTH INSECT DEVELOPMENT AND FOLIAGE EXPANSION AS OF MAY 12, 1985

Development Unit VI --- Plot Nos. Sampled - 1, 3, 5, 9, 10

Insect Development	Average %	No. of Trees Sampled
Egg Hatch	29.1	50
Instar 1st	21.7	50
2nd	59.8	50
3rd	18.5	50
Foliage Expansion		
White Oak	8.9	21
Red Oak	6.5	23
Other	4.7	4

Development Unit VII --- Plot Nos. Sampled - 2, 5, 7, 11, 12

Insect Development	Average %	No. of Trees Sampled
Egg Hatch	38.9	50
Instar 1st	64.47	50
2nd	31.73	50
3rd	3.78	50
Foliage Expansion		
White Oak	12.14	21
Red Oak	11.66	18
Other	54.00	10

APPENDIX TABLE 4

ALLEGHENY NATIONAL FOREST - 1985 SPRAY RECORD FOR SUPPRESSION PROJECT SHOWING SPRAY DATES, LOAD TIMES AND GALLONAGE SPRAYED BY INSECTICIDE

B.t. Spray Blocks[1]

Dev. Unit	Block I.D.	Ranger District	Net Acres	Date	Time Started	Time Stopped	Total Time	Gallons Sprayed
I	A	M	143	5/16	6:17pm	6:27pm	10min.	80
				5/16	6:30pm	6:32pm	2min.	0
				5/16	6:33pm	6:41pm	8min.	63
Subtotal		M	143				20min.	143
III	H	M	437	5/17	8:37am	8:52am	15min.	90
				5/17	8:55am	9:10am	15min.	90
				5/17	9:33am	9:47am	14min.	90
				5/17	9:51am	10:05am	14min.	90
				5/17	10:07am	10:24am	17min.	77
Subtotal		M	437				75min.	437
VII	B	B	236	5/20	7:37pm	7:50pm	13min.	90
				5/20	7:53pm	8:07pm	14min.	90
				5/20	8:11pm	8:21pm	10min.	56
	C	B	100	5/21	12:16pm	12:33pm	17min.	100
	D	B	228	5/20	6:57pm	7:07pm	10min.	90
				5/20	7:09pm	7:18pm	9min.	90
				5/20	7:20pm	7:26pm	6min.	48
	E	B	212	5/21	12:37pm	12:52pm	15min.	106
				5/21	12:58pm	1:11pm	13min.	106
	F	B	43	5/21	2:21pm	2:30pm	9min.	43
	G	B	---	5/21	2:00pm	2:14pm	14min.	87
Subtotal		B	906				130min.	906
Grand Total B.t.			1,486				225min.	1,486

[1] All blocks sprayed by Bell 206B

APPENDIX TABLE 4 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 SPRAY RECORD FOR SUPPRESSION PROJECT SHOWING SPRAY DATES, LOAD TIMES AND GALLONAGE SPRAYED BY INSECTICIDE

Dimilin Spray Blocks

Dev. Unit	Block I.D.	Ranger District	Net Acres	Date	Time Started	Time Stopped	Total Time	Gallons Sprayed
I	7	M	59	5/16	6:21pm	------		
	8	M	137	5/16	------	6:51pm	30min.	200
	9	M	131	5/16	7:34pm	------		
	10	M	118	5/16	------	8:12pm	38min.	250
	11	M	122	5/16	7:00pm	------		
	12	M	82	5/16	------	7:27pm	27min.	205
Subtotal		M	649				95min.	655
II	13	M	318	5/17	7:15am	7:42am	27min.	250
	14	M	48	5/17	7:48am	8:22am	34min.	250
	15	M	490	5/17	10:02am	10:31am	29min.	260
	16	M	135	5/17	10:37am	10:55am	18min.	225
	17	M	160	5/18	5:59am	6:29am	30min.	260
	18	M	281	5/18	6:41am	7:16am	35min.	260
	21	M	109	5/18	7:31am	------		
	22	M	78	5/18	------	------		
	23	M	147	5/18	------	8:08am	37min.	265
	24	M	409	5/18	8:19am	8:38am	29min.	260
	25	M	86	5/18	8:47am	9:15am	28min.	260
	26	M	50	5/18	9:26am	------		
	27	M	52	5/18	------	9:36am	10min.	75
Subtotal		M	2,363				159min.	2,365
III	31	M	398	5/18	6:44am	7:16am	32min.	101.9
				5/18	7:27am	7:50am	23min.	100.1
				5/18	8:16am	8:31am	15min.	100.0
				5/18	8:34am	8:47am	13min.	98.1
Subtotal		M	398				83min.	400

APPENDIX TABLE 4 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 SPRAY RECORD FOR SUPPRESSION PROJECT SHOWING SPRAY DATES, LOAD TIMES AND GALLONAGE SPRAYED BY INSFCTICIDE

Dimilin Spray Blocks

Dev. Unit	Block I.D.	Ranger District	Net Acres	Date	Time Started	Time Stopped	Total Time	Gallons Sprayed
IV	34	S	100	5/19	6:23am	------		
	35	S	107	5/19	------	------		
	36	S	103	5/19	------	7:19am	49min.	310
	37	S	36	5/19	7:19am			
	38	S	52	5/19	------	------		
	39	S	128	5/19	------	7:53am	34min.	216
	40	S	186	5/19	8:02am			
	41	S	112	5/19	------	8:27am	25min.	298
	42	S	41	5/19	8:44am	------		
	43	S	57	5/19	------	------		
	44	S	89	5/19	------	------		
	45	S	75	5/19	------	9:23am	37min.	262
Subtotal		S	1,086				143min.	1,086
V	46	S	278	5/19	7:45pm	8:05pm	20min.	278
	47	S	369	5/19	8:09pm	8:34pm	25min.	278
	48	S	187	5/20	6:01am	6:45am	44min.	278
	49	S	178	5/20	7:03am	7:26am	23min.	178
	50	S	145	5/20	7:33am	8:02am	29min.	145
	51	S	565	5/20	8:45am	9:07am	22min.	236
	52	S	143	5/20	9:35am	10:11am	36min.	236
	53	S	590	5/21	10:34am	11:05am	31min.	227
	54	S	92	5/21	11:36am	11:59am	23min.	228
	55	S	482	5/21	12:06pm	12:34pm	28min.	241
	56	S	81	5/21	1:01pm	------		
	57	S	84	5/21	------	------		
	58	S	50	5/21	------	1:30pm	29min.	215
Subtotal		S	3.244				369min.	3,244

APPENDIX TABLE 4 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 SPRAY RECORD FOR SUPPRESSION PROJECT SHOWING SPRAY DATES, LOAD TIMES AND GALLONAGE SPRAYED BY INSECTICIDE

Dimilin Spray Blocks

Dev. Unit	Block I.D.	Ranger District	Net Acres	Date	Time Started	Time Stopped	Total Time	Gallons Sprayed
VI	65	S	201	5/19	6:25am	6:38am	13min.	90
				5/19	6:42am	6:53am	11min.	90
				5/19	6:55am	7:00am	5min.	21
	66	S	73	5/19	7:00am	7:10am	10min.	73
	67	S	42	5/19	6:01am	------		
	68	S	45	5/19	------	6:22am	21min.	87
	69	S	42	5/19	9:58am	10:03am	5min.	42
	70	S	102	5/19	10:12am	10:22am	10min.	102
	71	S	123	5/19	10:26am	10:36am	10min.	90
				5/20	6:34am	6:39am	5min.	33
	72	S	53	5/20	6:39am	6:46am	7min.	53
	73	S	191	5/20	7:18am	7:31am	13min.	95
					7:35am	7:46am	11min.	96
	74	S	62	5/20	6:47am	6:59am	12min.	62
	75	S	22	5/20	6:59am	7:04am	5min.	22
	76	S	39	5/20	7:06am	7:16am	10min.	39
	77	S	256	5/19	7:45am	8:10am	24min.	90
				5/19	8:12am	8:29am	17min.	90
			___	5/19	8:32am	8:42am	10min.	76
Subtotal		S	1,251				199min.	1,251
Grand Total, Dimilin			8,991				1,067min.	9,001

[2] Blocks 7-27, and 34-58 sprayed with Bell 204B
Blocks 31, and 65-77 sprayed with Bell 206B

APPENDIX TABLE 5

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - GENERAL WEATHER CONDITIONS AND WEATHER NOTES DURING SPRAYING

Date	Weather	Spray Activity
May 14	Cool and dry	Calibrated Bell 204B & 206B Helicopter in PM
May 15	Cold front approaching with gusty winds and showers	No spraying either AM or PM
May 16	Rain in morning, partial clearing PM	Sprayed Loleta C.C. and Dev. Unit I in PM, done by 8:10PM
May 17	Began raining very lightly after 1PM over scattered locations of the Forest; very local heavy showers began about 4PM	Sprayed Dev. Unit II which remained free of rain until about 1PM but heavy shower there about 4PM. Last load of B.t. put in Tubbs Run in light drizzle. No PM spraying.
May 18	Quite cool (41°F) and clear; although plateau was clear early, dense ground fog along drainages changed to stratus then to cumulus during spraying winds up to 7 mph	Sprayed block 31 and finished Dev. Unit II between ca. 5:45 & 9:45AM
May 19	Frost overnight; cold and clear; excellent visibility very little ground fog, no stratus or cumulus developing at 1000 feet AGL; gusty winds >10 mph in afternoon died down at 8PM	Spraying from ca. 6:30AM with first light until ca. 10:30AM when winds increased; dry all day and into evening but no PM spray

APPENDIX TABLE 5 (cont'd.)

ALLEGHENY NATIONAL FOREST

1985 GYPSY MOTH SUPPRESSION - GENERAL WEATHER CONDITIONS AND WEATHER NOTES DURING SPRAYING

Date	Weather	Spray Activity
May 20	Clear overnight; slight winds early becoming gusty after 10AM (>10 mph); fast moving cold front brought locally intense tunderstorms about 10PM but most were north into New York State	Spraying suspended when sustained gusts exceeded >10 mph; light rain fell at Willow Bay CG 45 minutes after spraying
May 21	Low ceiling at sunrise, but clouds broke by mid-morning and clearing by noon; light winds and 67°	Spraying began in mid-morning and conditions were sunny and clear

APPENDIX TABLE 6

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH SUPPRESSION SPRAY MONITORING

B.T. SPRAY BLOCKS

Gypsy Moth Dev. Unit	Block I.D.	Ranger Dist.	Developed Rec. Site Name	Net Acres	% Monitored
I	A	M	Loleta	143	100
Subtotal	1			143	100
VII	B	B	Willow Bay	236	0
	C	B	Hook's Brook	100	0
	D	B	Tracy Ridge	228	100
	E	B	Handsome Lake & Hopewell	212	0
	F	B	Rimrock	43	0
	G	B	Morrison	87	0
Subtotal	6			906	25
Rec. Site TOTAL	7			1,049	35

Gypsy Moth Dev. Unit	Block I.D.	Ranger Dist.	Comp.-Block Number	Net Acres	% Monitored
III	H	M	2 - 1	437	0
B.t. Grand Total	8			1,487	25

APPENDIX TABLE 6 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH SUPPRESSION SPRAY MONITORING

Dimilin Spray Blocks

Gypsy Moth Dev. Unit	Block I.D.	Ranger Dist.	Comp.-Block Number	Net Acres	% Monitored
I	7	M	92 - 1	59	0
	8	M	92 - 2	137	0
	9	M	105 - 1	131	100
	10	M	105 - 2	118	100
	11	M	105 - 3	122	100
	12	M	106 - 1	82	100
Subtotal	6			649	70
II	13	M	20 - 1	318	0
	14	M	21 - 1	48	0
	15	M	21 - 2	490	0
	16	M	22 - 1	135	0
	17	M	23 - 1	160	100
	18	M	23 - 2	281	100
	21	M	24 - 2	109	0
	22	M	24 - 3	78	0
	23	M	25 - 1	147	100
	24	M	28 - 1	409	100
	25	M	28 - 2	86	100
	26	M	28 - 3	50	100
	27	M	28 - 4	52	100
Subtotal	13			2,363	50
III	31	M	14 - 1	398	35
Subtotal	1			398	35

APPENDIX TABLE 6 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH SUPPRESSION SPRAY MONITORING

Dimilin Spray Blocks

Gypsy Moth Dev. Unit	Block I.D.	Ranger Dist.	Comp.-Block Number	Net Acres	% Monitored
IV	34	S	81 - 1	100	100
	35	S	81 - 2	107	100
	36	S	82 - 2	103	100
	37	S	82 - 3	36	100
	38	S	82 - 4	52	100
	39	S	83 - 1	128	100
	40	S	84 - 1	186	0
	41	S	131 - 1	112	0
	42	S	131 - 2	41	0
	43	S	131 - 3	57	0
	44	S	131 - 4	89	0
	45	S	132 - 1	75	0
Subtotal	12			1,086	48

APPENDIX TABLE 6 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH SUPPRESSION SPRAY MONITORING

Gypsy Moth Dev. Unit	Block I.D.	Dimilin Spray Blocks Ranger Dist.	Comp.-Block Number	Net Acres	% Monitored
V	46	S	89 - 1	278	0
	47	S	118 - 1	369	100
	48	S	119 - 3	187	25
	49	S	121 - 2	178	0
	50	S	137 - 1	145	10
	51	S	138 - 2	565	100
	52	S	139 - 1	143	25
	53	S	140 - 1	590	0
	54	S	144 - 1	92	0
	55	S	144 - 2	482	0
	56	S	145 - 1	81	0
	57	S	145 - 2	84	0
	58	S	145 - 3	50	0
Subtotal	13			3,244	32

APPENDIX TABLE 6 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH SUPPRESSION SPRAY MONITORING

Dimilin Spray Blocks

Gypsy Moth Dev. Unit	Block I.D.	Ranger Dist.	Comp.-Block Number	Net Acres	% Monitored
VI	65	S	5 - 1	201	0
	66	S	7 - 1	73	0
	67	S	7 - 2	42	0
	68	S	7 - 3	45	0
	69	S	9 - 1	42	0
	70	S	9 - 2	102	100
	71	S	9 - 3	123	100
	72	S	9 - 4	53	100
	73	S	18 - 1	191	100
	74	S	19 - 1	62	100
	75	S	19 - 2	22	100
	76	S	19 - 3	39	100
	77	S	29 - 1	256	25
Subtotal	13			1,251	60
Dimilin GRAND TOTAL	53			8,991	47
GRAND TOTAL All Spray				10,477	43

APPENDIX TABLE 7

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH SUPPRESSION PROJECT POST-TREATMENT EVALUATION COMPARISON OF EGG MASS DENSITY AND DEFOLIATION BY RANGER DISTRICT AND SPRAY MATERIAL

SPRAYED

BRADFORD RANGER DISTRICT
(Dipel 8L @ 20 BIU/AC)

Ento Area	Net Acres	Mean EM/A (Plots) 1984	1985	1984-85 % Change	Defoliation (1) '85 Actual	'86 Pot'l
B1	9188	1,089(25)	1,720(10)	+58	M	S
B2	5621	856(6)	1,160(2)	+36	M	S
B3	6208	779(8)	1,433(6)	+84	M	S
B4	2545	-	-	-	-	-
B5	3714	-	-	-	-	-
B6	3506	-	-	-	-	-
B7	4063	-	-	-	-	-
B8	5344	-	-	-	-	-
B9	5818	-	-	-	-	-
TOTAL	46,007	908(39)	1,438(18)	+58	M	S
TOTAL DIPEL		908(30)	1,438(18)	+58	M	S

UNSPRAYED CHECK

B1		1,213(3)	9,326(14)	+669	M	S
B2		629(6)	800(8)	+27	L	M
B3		498(8)	636(11)	+28	L	L
B4		102(15)	104(15)	+2	L	L
B5		297(13)	237(15)	-20	L	L
B6		224(6)	694(14)	+190	L	L
B7		-	3,972(20)	-	-	-
B8		-	982(20)	-	-	S
B9		-	2,432(20)	-	-	S
TOTAL		494(51)	2,216(122)	+330	L	S
TOTAL CHECK		494(51)	2,216(122)	+330	L	S

APPENDIX TABLE 7 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH SUPPRESSION PROJECT POST-TREATMENT EVALUATION COMPARISON OF EGG MASS DENSITY AND DEFOLIATION BY RANGER DISTRICT AND SPRAY MATERIAL

SPRAYED

MARIENVILLE RANGER DISTRICT
(Dimilin 25W @ 1/2 oz./AC)

Ento Area	Net Acres	Mean EM/A (Plots) 1984	1985	1984-85 % Change	Defoliation (1) '85 Actual	'86 Pot'l
M1	3941	1,382(3)	-	-	M	-
M2	2966	-	-	-	-	-
M3	2392	-	90(4)	-	-	L
M4	2418	-	-	-	-	-
M5	3711	179(1)	179(19)	0	L	L
M6	5284	745(3)	105(20)	-86	M	L
M7	4126	-	-	-	-	-
M8	3815	302(7)	23(14)	-92	L	L
TOTAL	28,653	652(14)	99(57)	-85	L	L

UNSPRAYED CHECK

M1	788(12)	1318(24)	+67	M	M
M2	1299(12)	2578(24)	+110	M	S
M3	455(5)	1549(16)	+240	L	S
M4	508(2)	1077(14)	+112	L	M
M5	117(1)	727(20)	+521	L	M
M6	791(10)	1437(26)	+82	M	S
M7	804(12)	152(38)	-429	M	L
M8	620(8)	42(17)	-93	L	L
TOTAL	664(62)	1110(179)	+67	M	M

APPENDIX TABLE 7 (cont'd.)

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH SUPPRESSION PROJECT POST-TREATMENT EVALUATION COMPARISON OF EGG MASS DENSITY AND DEFOLIATION BY RANGER DISTRICT AND SPRAY MATERIAL

SPRAYED

SHEFFIELD RANGER DISTRICT
(Dimilin 25W @ 1/2 oz./AC)

Ento Area	Net Acres	Mean EM/A (Plots) 1984	1985	1984-85 % Change	Defoliation (1) '85 Actual	'86 Pot'l
S1	4239	580(4)	83(9)	-86	L	L
S2	4210	56(2)	13(13)	-77	L	L
S3	6744	671(4)	72(5)	-89	L	L
S4	7790	-	-	-	-	-
S5	3500	482(9)	80(16)	-83	L	L
S6	4456	-	-	-	-	-
S7	3198	576(6)	106(7)	-82	L	L
S8	9873	522(4)	33(19)	-94	L	L
S9	3513	987(6)	105(13)	-89	M	L
S10	3283	1145(8)	176(14)	-85	M	L
S11	4091	-	-	-	-	-
TOTAL	54,897	627(43)	84(96)	-87	L	L
TOTAL DIMILIN		640(57)	92(153)	-86	L	L

UNSPRAYED CHECK

S1	492(20)	398(10)	-16	L	L
S2	383(13)	45(17)	-88	L	L
S3	572(3)	136(5)	-76	L	L
S4	396(16)	-	-	L	-
S5	892(7)	371(17)	-58	M	L
S6	428(19)	-	-	L	-
S7	468(9)	1139(12)	+143	L	M
S8	381(11)	149(19)	-61	L	L
S9	310(23)	680(4)	+119	L	L
S10	1008(7)	554(12)	-45	M	L
S11	4877(15)	1836(38)	-62	S	S
TOTAL	926(153)	590(15)	-36	M	L
TOTAL CHECK	795(215)	850(194)	+7	M	M

(1) L=30% Defoliation; M=30-60% Defoliation; S=60% Defoliation

APPENDIX TABLE 8

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH EGG MASS HATCH AT THREE HEIGHTS ABOVE THE GROUND AND FOR THE ENTIRE SAMPLE WITHIN EACH DEVELOPMENT UNIT

Development Unit	Date Sampled	Sample	Height above Ground (ft.)		Total Sampled
		<1	1-3	3-6	
		- % Unhatched Egg Masses -			
I	5/23	18	30	30	78/300
II	5/23-24	9	27	37	72/300
III	5/23	10	24	46	80/300
IV	5/24	11	33	47	90/300
V	5/23	6	32	56	92/290
VI	5/24	18	24	34	86/300
VII	5/24	8	19	22	49/300
					547/2090
MEAN		11.4	27.0	38.9	26.17
		- % Partial Hatched Egg Masses -			
I	5/23	28	48	52	128/300
II	5/23-24	17	46	38	101/300
III	5/23	25	43	37	105/300
IV	5/24	16	34	42	92/300
V	5/23	34	36	30	100/290
VI	5/24	25	52	40	117/300
VII	5/24	30	52	57	139/300
					782/2090
MEAN		25.0	44.4	42.3	37.4
		- % Fully Hatched Egg Masses -			
I	5/23	54	22	18	94/300
II	5/23-24	74	27	25	126/300
III	5/23	65	33	17	115/300
IV	5/24	73	33	11	117/300
V	5/23	60	32	14	106/290
VI	5/24	57	24	26	107/300
VII	5/24	62	29	21	112/300
					777/2090
MEAN		63.6	28.6	18.9	37.2

APPENDIX TABLE 9

ALLEGHENY NATIONAL FOREST - 1985 GYPSY MOTH DEFOLIATON DEVELOPMENT FOR "HOT SPOTS" **DEFERRED FROM SPRAYING**

	Compartment					Deferred Spraying Block		
Ranger District	No.	Net Acres	Defol. Class (1)	Dev. Unit	I.D. No(s)	Acres	Defol. Class (1)	% Compt Defol.
Marien-	1	407	M	III	28	190	M	46.7
ville	6	593	M		29	437	M	73.7
	7	1719	M		30	90	L	5.2
	15	934	L		32	408	L	43.7
	18	1399	L		33	388	L	27.7
	24	1140	M	II	20	60	L	5.3
	65	706	M	I	1	190	M	26.9
	66	751	S		2,3,4	493	S	65.6
	67	1043	L		5	163	S	15.6
	77	1086	M		6	550	S	50.6
Shef-	151	1082	L	V	59	359	L	33.2
field	152	566	M		60,61	279	L	49.2
	153	1008	M		62	471	M	46.7
	154	1035	L		63,64	210	L	20.3
TOTAL		13,469				4,288		31.8

(1) Class of Defoliation on >20% of net area

L = Light (<30%)
M = Moderate (30-60%)
S = Severe (>60%)

APPENDIX TABLE 10
ALLEGHENY NATIONAL FOREST
SUMMARY OF COSTS FOR 1985 SUPPRESSION PROJECT

A. CONTRACTING SERVICES

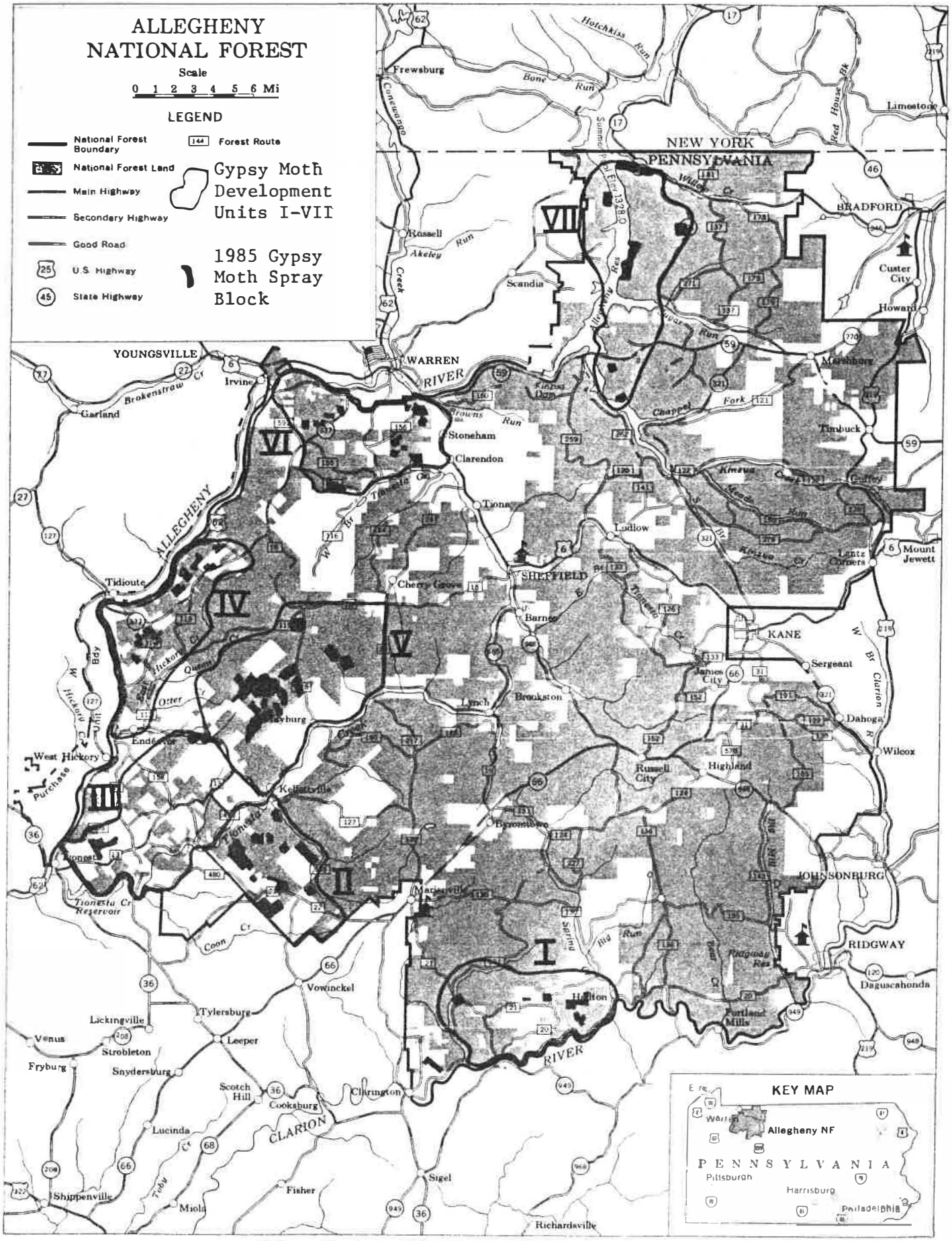
Aerial application costs associated with purchase of Dimilin 25W (Dipel 8L will be provided by the Forest Service, FPM, NA) and storage, transport, mixing/loading, helicopter application, cleanup for Dimilin 25W and Dipel 8L on an estimated 10,477 + 10% acres.

TOTAL	$85,669

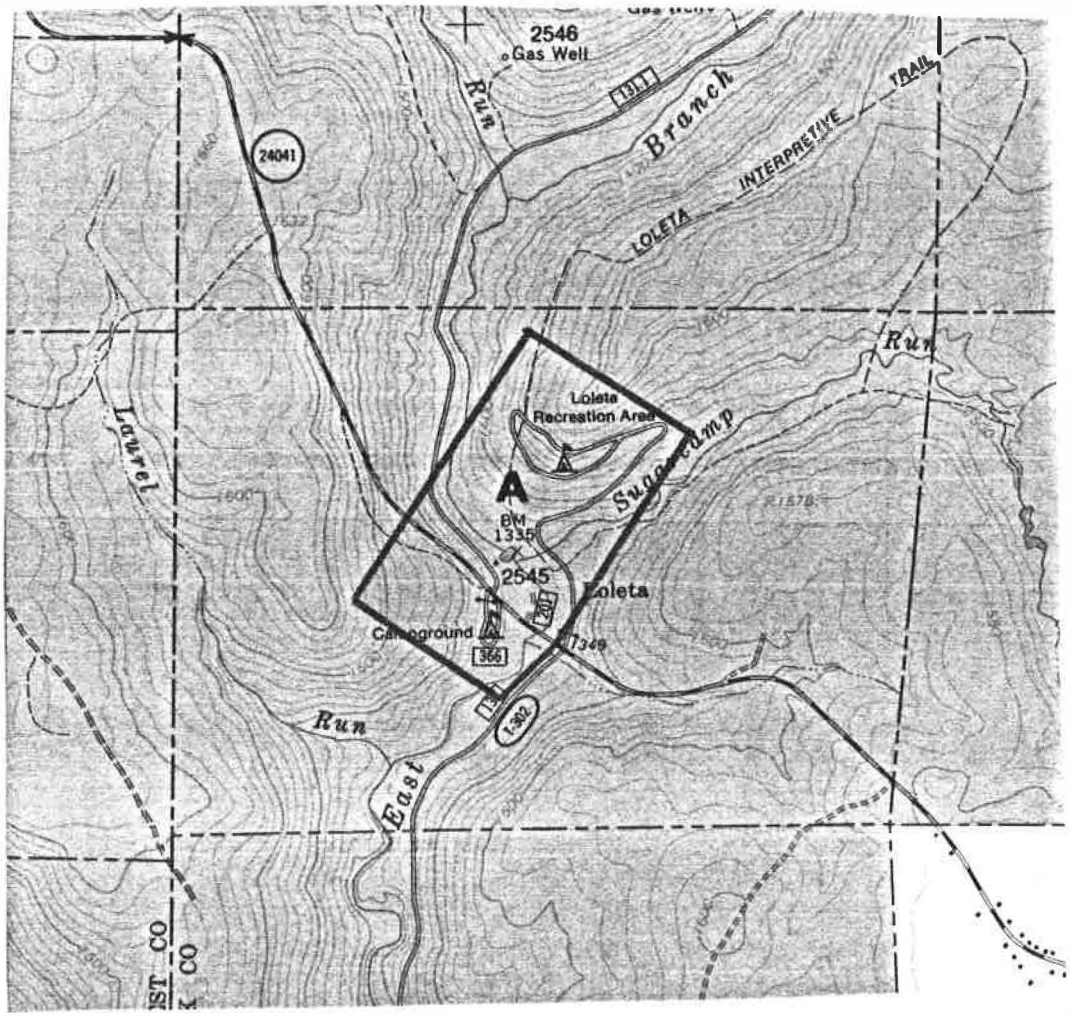
B. TECHNICAL SUPPORT AND MONITORING BY FPM, MORGANTOWN

Item	(Program Funds)	Project Cost
I. Personnel		
Temporary	-	7,024
Permanent	(12,451)	-
Subtotals	-	7,024
II. Per Diem		
Temporary	-	11,200
Permanent	-	8,750
Subtotals	-	19,950
III. Overtime		
Temporary	-	4,333
Permanent	-	1,348
Subtotals	-	5,681
IV. Vehicles	-	4,735
V. Services		
Helicopter Inspection	-	210
Spray Monitoring Aircraft	-	3,590
Aerial Photography	-	7,500
Subtotals	-	11,300
VI. Equipment & Supplies	-	6,510
Totals	(12,451)	55,200
C. ALLEGHENY NF & R-9 Regional Office		31,000
GRAND TOTAL		171,869

Map 1. Allegheny National Forest, 1985 Gypsy Moth Suppression Project



Map 2. Allegheny National Forest, Marienville Ranger District, 1985 Gypsy Moth Suppression Project, Development Unit I, Spray Block A, B.t. Treatment



SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

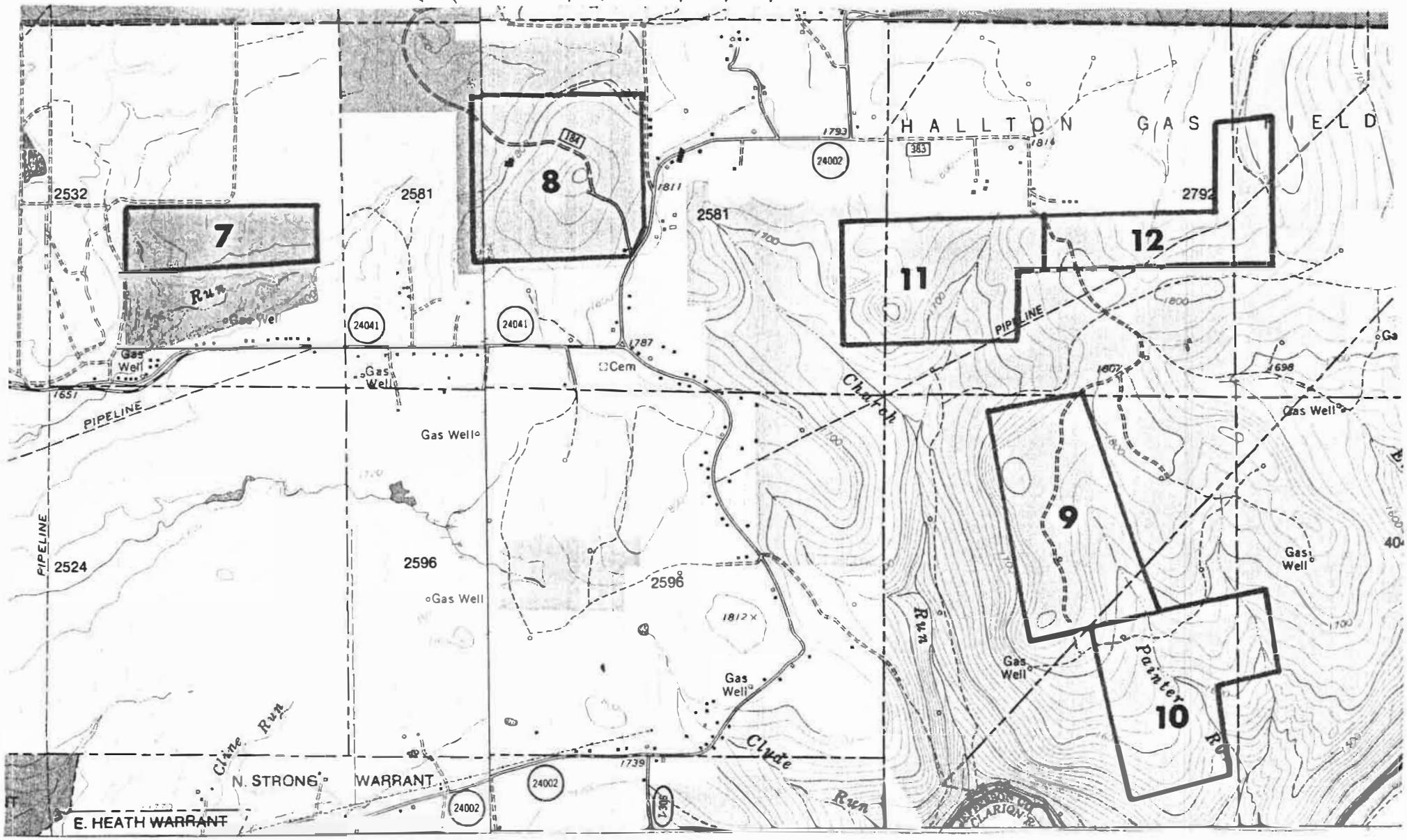
MN GN
8½° 51 MILS
1°23' 25 MILS

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

LEGEND

- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Trail, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 299 County/Township Road
- 351 Forest Road
- 304 Forest Trail

Map 3. Allegheny National Forest, Marienville Ranger District
1985 Gypsy Moth Suppression Project, Development Unit I,
Spray Blocks 7, 8, 9, 10, 11, 12, Dimilin Treatment



SCALE 1:24 000

1 MILE
7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET

Map 4. Allegheny National Forest, Marienville Ranger District,
1985 Gypsy Moth Suppression Project, Development Unit II
Spray Blocks 13, 14, 23, 26, 27, Dimilin Treatment

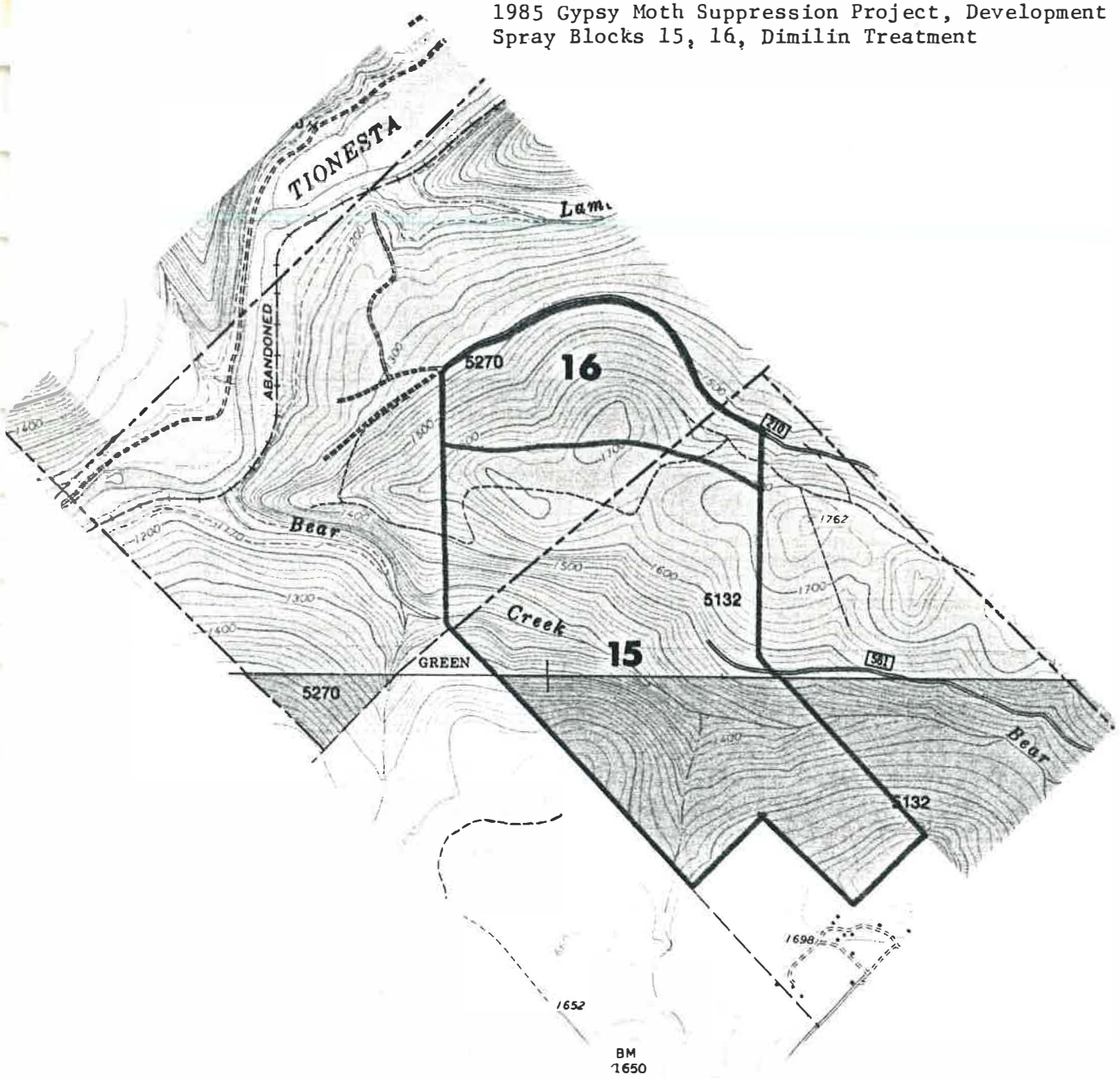
SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

MN GN
8° 1° 07'
142 MILS 20 MILS

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Map 5. Allegheny National Forest, Marienville Ranger District
1985 Gypsy Moth Suppression Project, Development Unit II
Spray Blocks 15, 16, Dimilin Treatment



SCALE 1:24 000

1 0 ½ 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

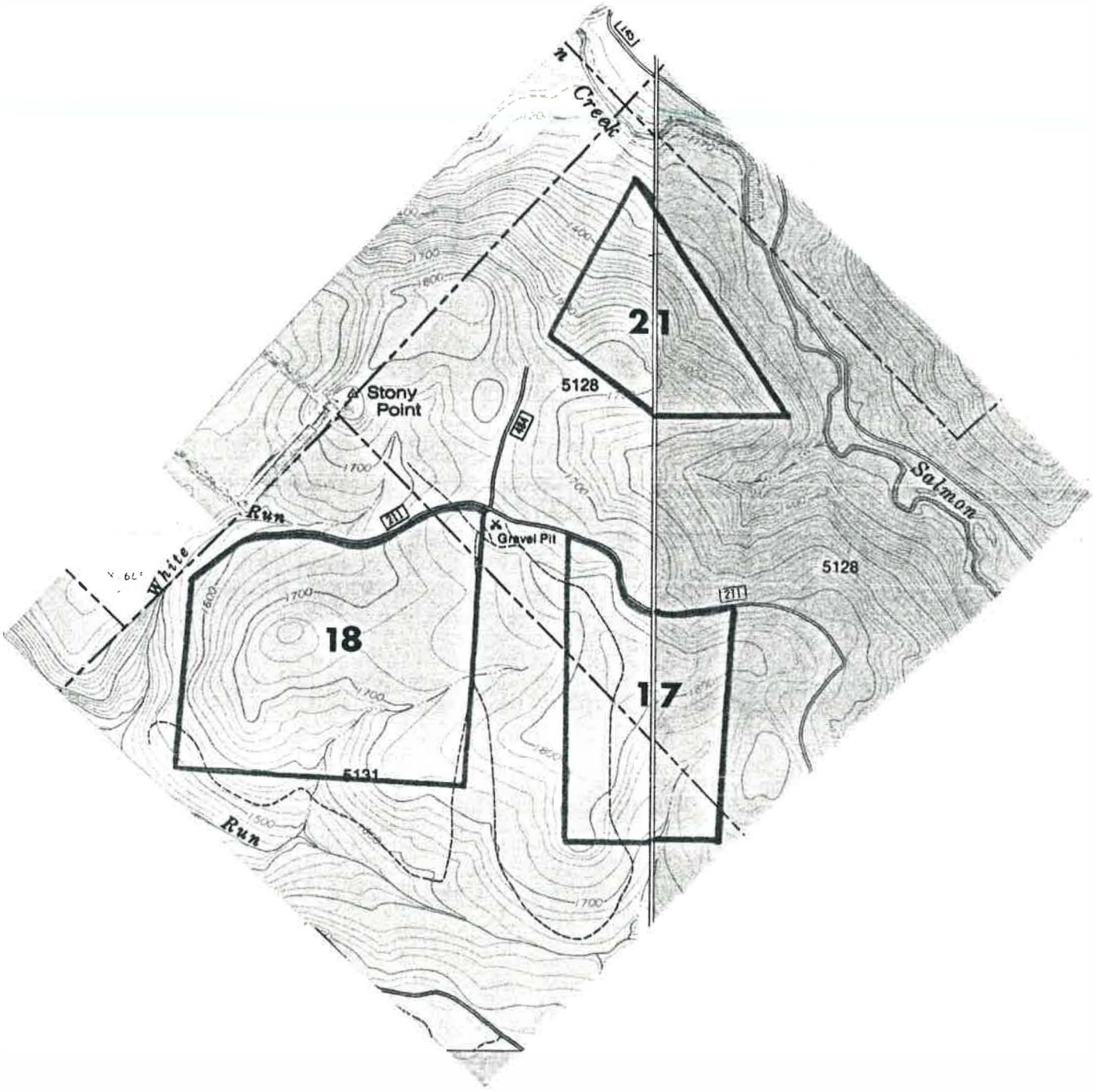
CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

MN GN
8° 142 MILS
1°23' 24 MILS
UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

LEGEND

- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Trail, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 799 County/Township Road
- 351 Forest Road
- 304 Forest Trail

Map 6. Allegheny National Forest, Marienville Ranger District
1985 Gypsy Moth Suppression Project, Development Unit II
Spray Blocks 17, 18, 21, Dimilin Treatment



SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

MN GN
8° 1°17'
14 MILS 23 MILS
U GRID AND 1983
N GNETIC NORTH
DECLINATION AT
CENTER OF SHEET

LEGEND

- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 799 County/Township Road
- 351 Forest Road
- 304 Forest Trail

Map 7. Allegheny National Forest, Marienville Ranger District
1985 Gypsy Moth Suppression Project, Development Unit II
Spray Blocks 22, 24, 25, Dimilin Treatment

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

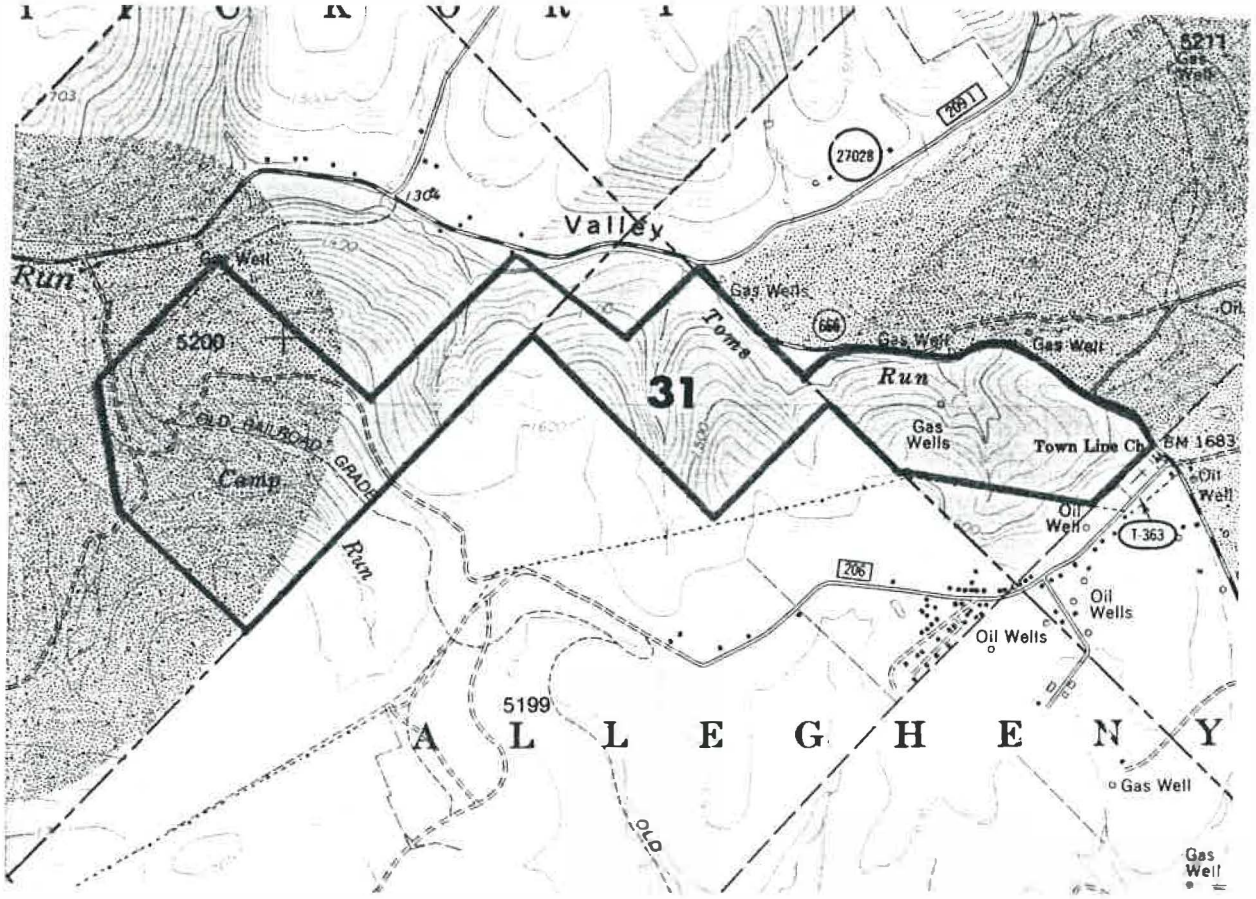
1 .5 0 1 KILOMETER

MN GN

8° 142 MILS 1° 12'

CONTOUR INTERVAL 20 FEET

Map 8. Allegheny National Forest, Marienville Ranger District
1985 Gypsy Moth Suppression Project, Development Unit III
Spray Block 31, Dimilin Treatment



SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

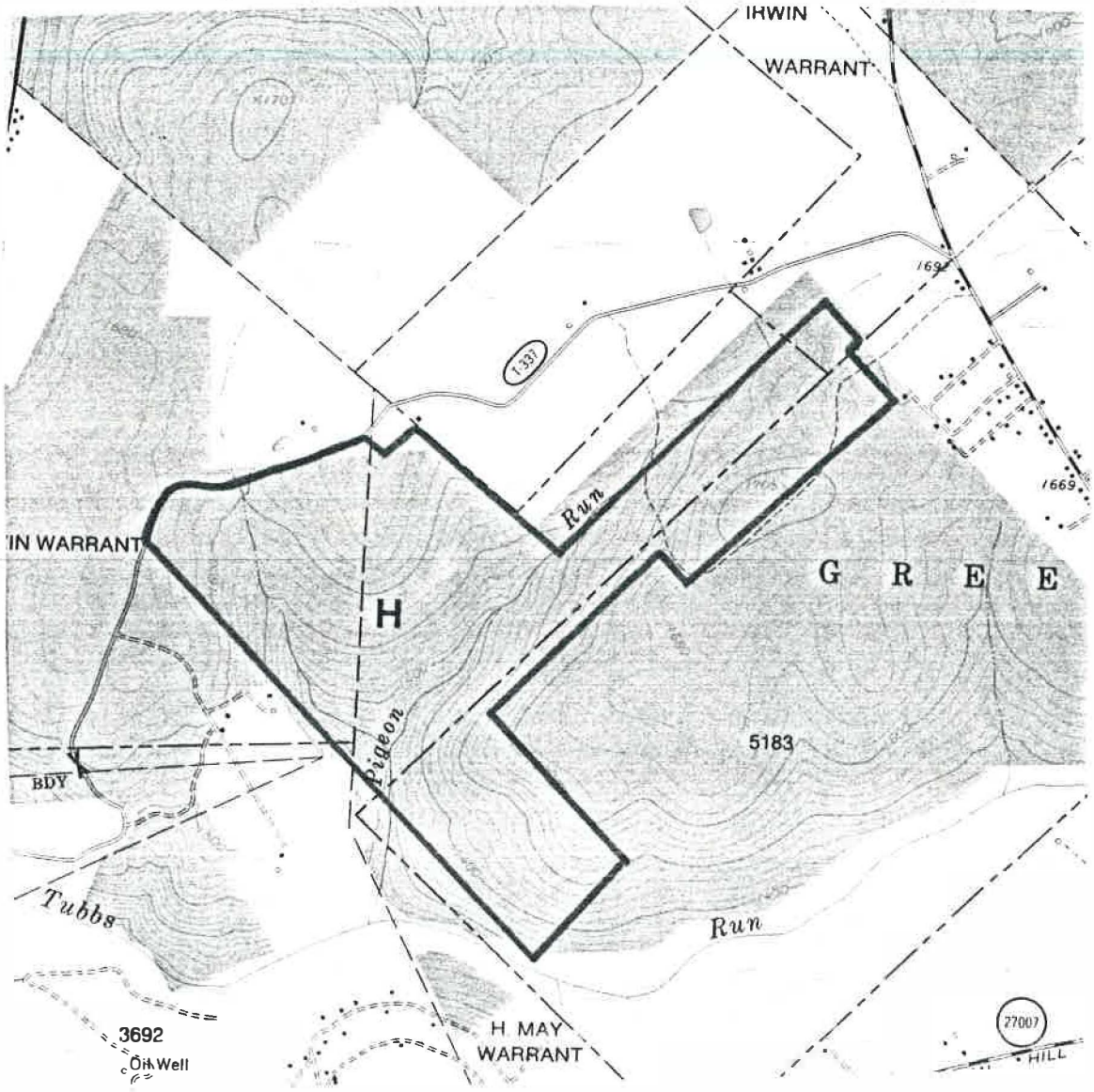
MN GN
7°½° 133 MILS
1° 07' 20 MILS

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

LEGEND

- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Trail, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 299 County/Township Road
- 351 Forest Road
- 304 Forest Trail

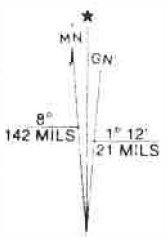
Map 9. Allegheny National Forest, Marienville Ranger District
1985 Gypsy Moth Suppression Project, Development Unit III
Spray Block H, B.t. Treatment



SCALE 1:24 000

1 MILE
1080 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

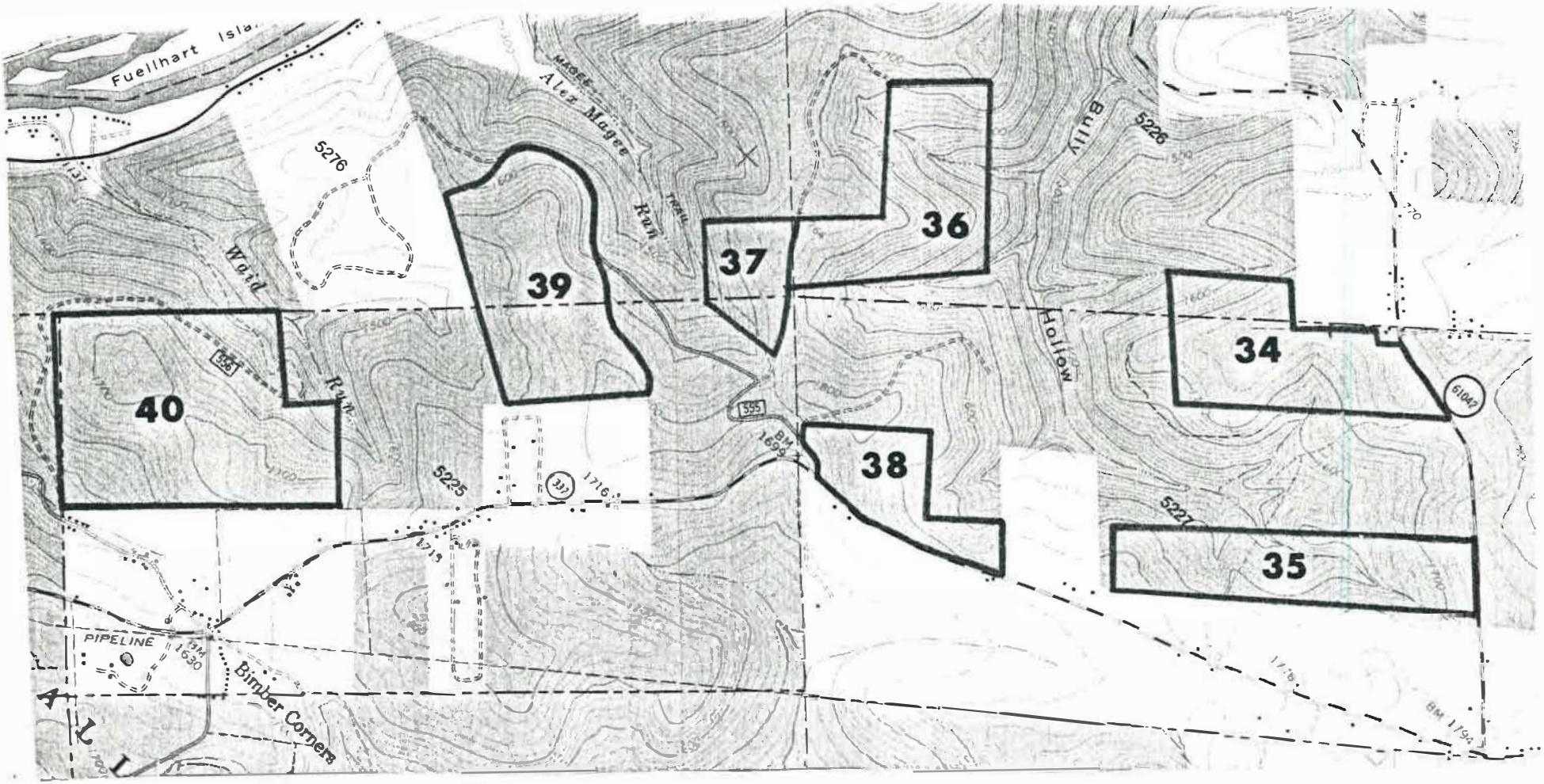


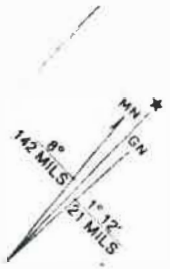
UTM GRID AND 1983
MAGNETIC NORTH
DECLINATION AT
CENTER OF SHEET

LEGEND

- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Trail, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 299 County/Township Road
- 351 Forest Road
- 304 Forest Trail

Map 10, Allegheny National Forest, Sheffield Ranger District
1985 Gypsy Moth Suppression Project, Development Unit IV
Spray Blocks 34-40, Dimilin Treatment



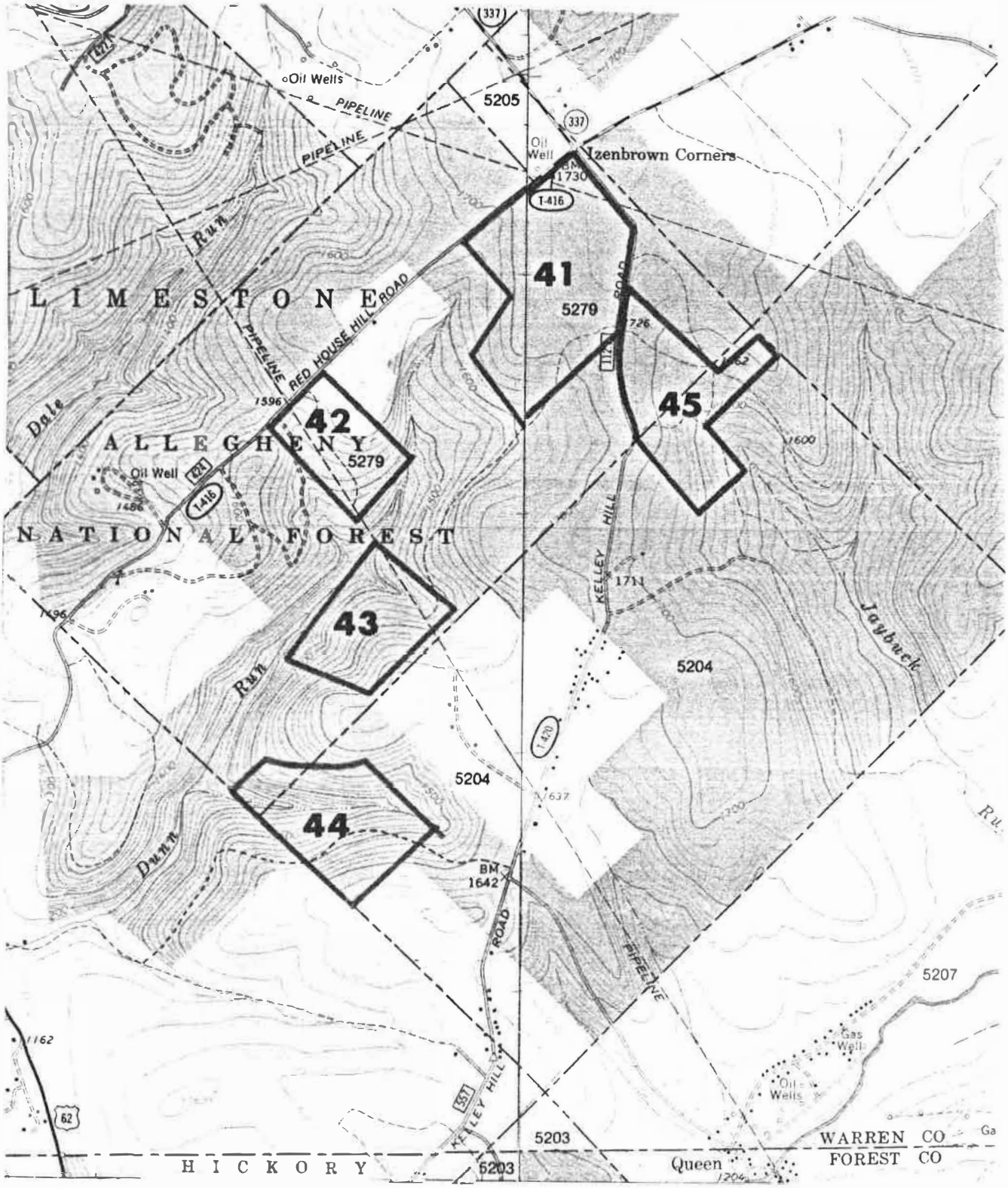


SCALE 1:24 000

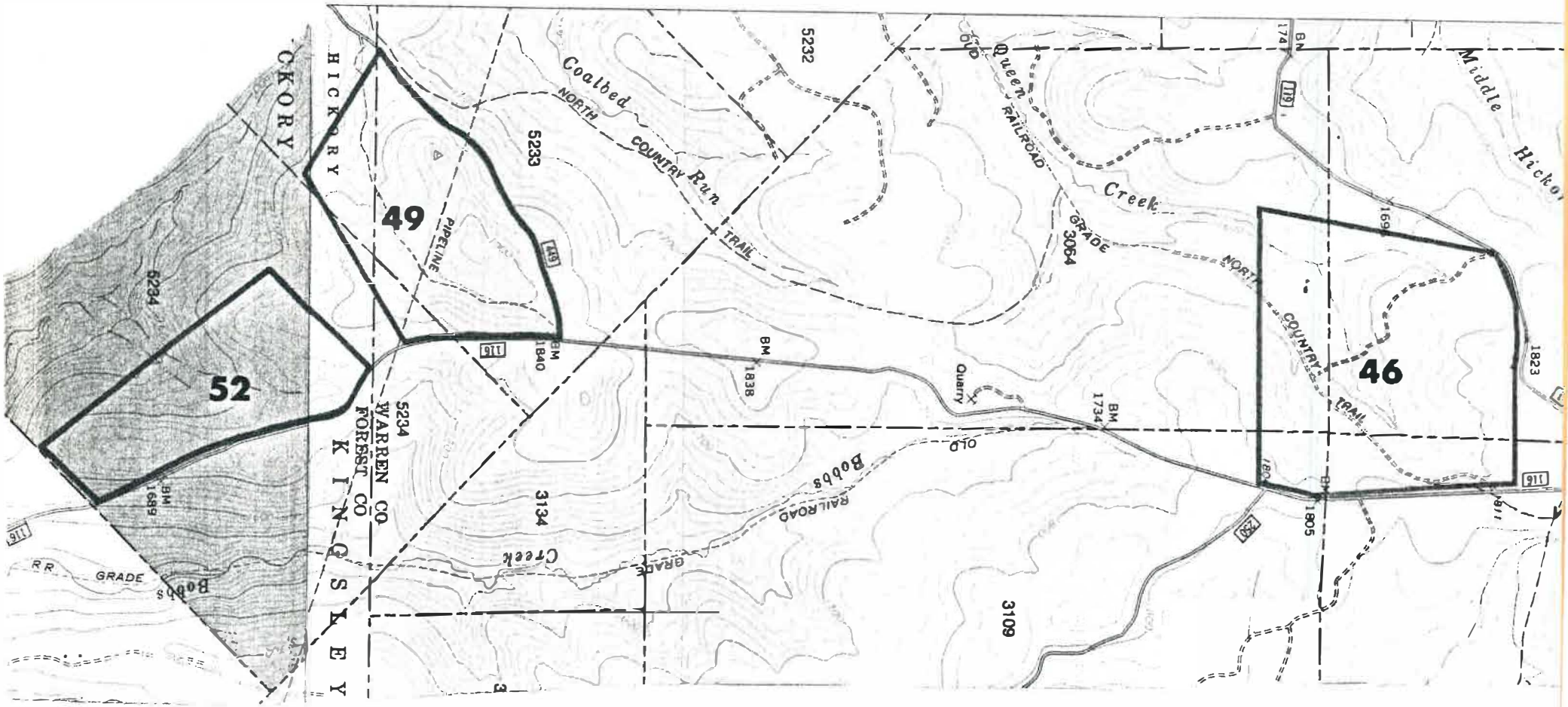
1 MILE
½ 0
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
1 ½ 0

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Map 11. Allegheny National Forest, Sheffield Ranger District
1985 Gypsy Moth Suppression Project, Development Unit IV
Spray Blocks 41-45, Dimilin Treatment



Map 12. Allegheny National Forest, Sheffield Ranger District
1985 Gypsy Moth Suppression Project, Development Unit V
Spray Blocks 46, 49, 52, Dimilin Treatment

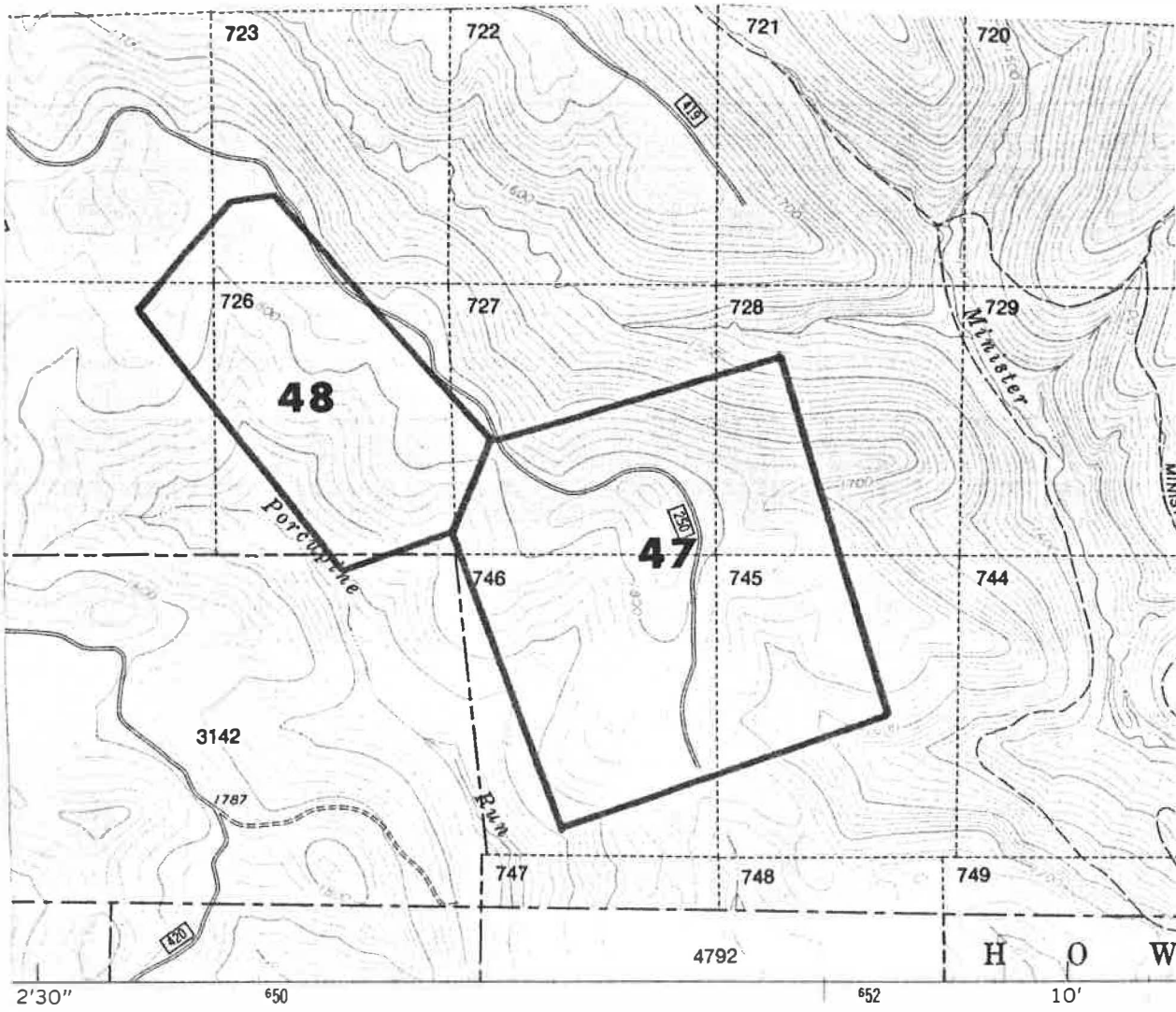


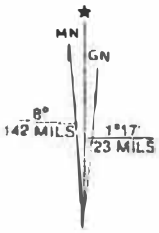
SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Map 13. Allegheny National Forest, Sheffield Ranger District
1985 Gypsy Moth Suppression Project, Development Unit V
Spray Blocks 47-48, Dimilin Treatment





SCALE 1:24 000

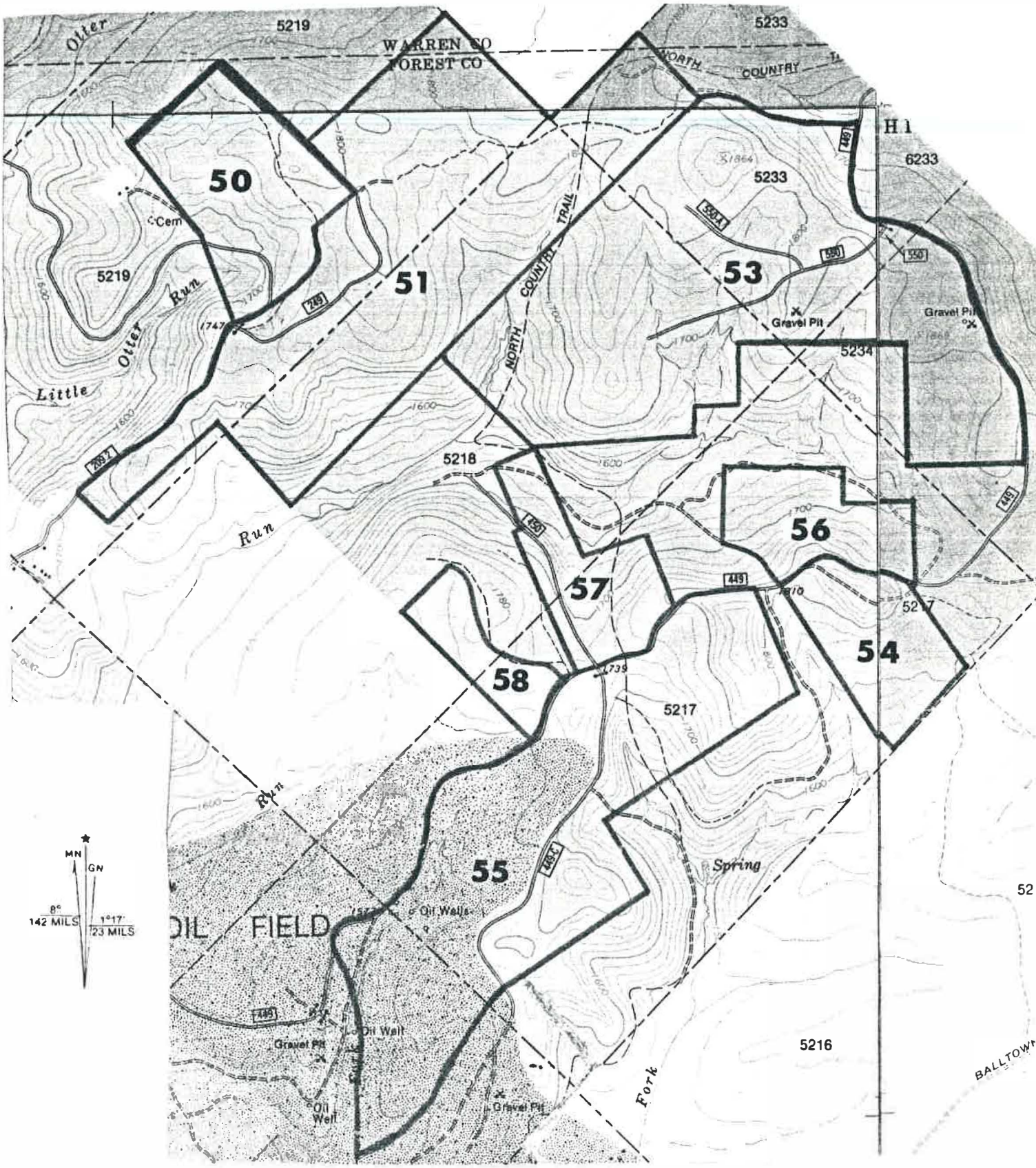
1 0 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

LEGEND

- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Trail, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 299 County/Township Road
- 351 Forest Road
- 304 Forest Trail

Map 14. Allegheny National Forest, Sheffield Ranger District
1985 Gypsy Moth Suppression Project, Development Unit V
Spray Blocks 50, 51, 53-58, Dimilin Treatment

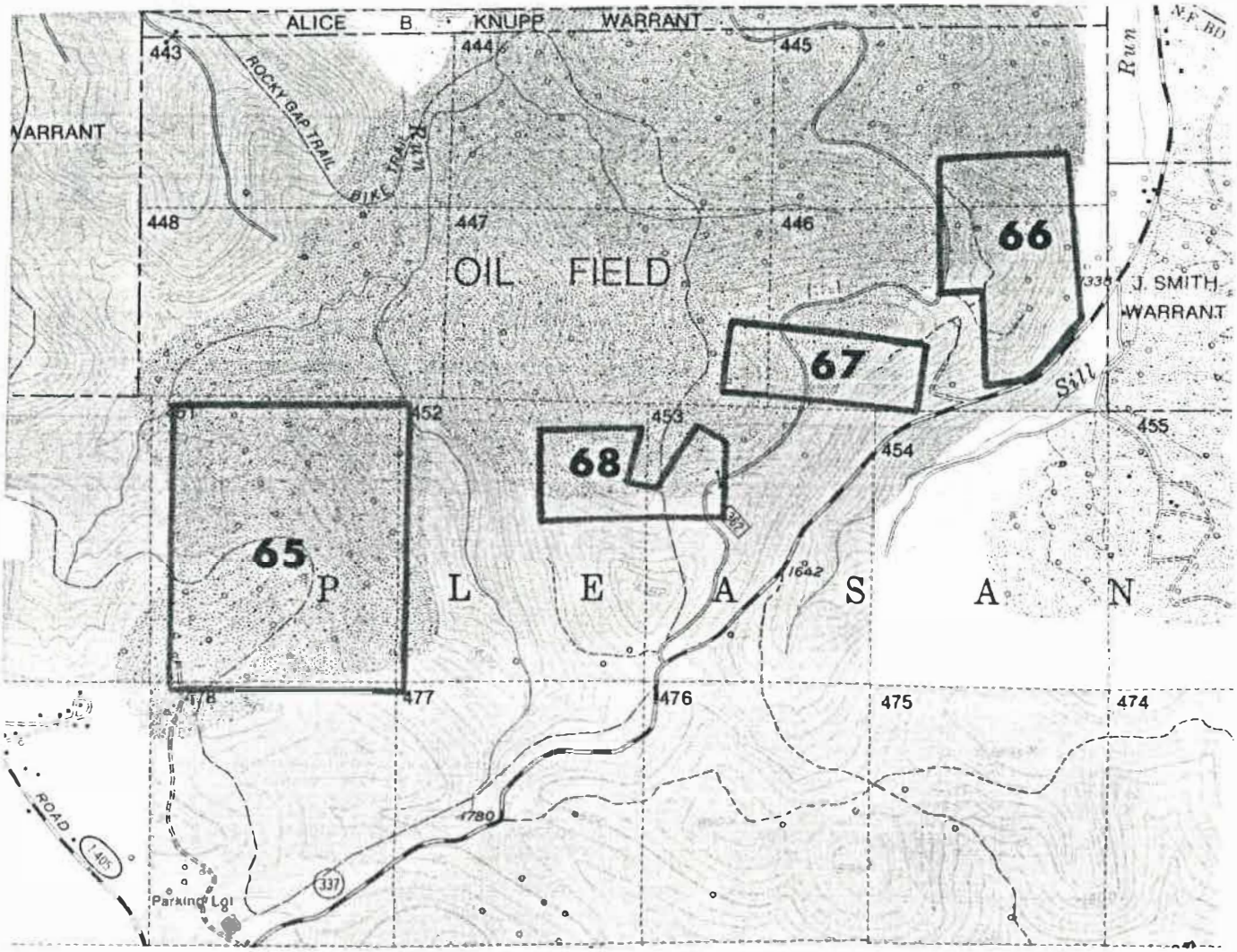


SCALE 1:24 000

1 MILE
7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Map 15. Allegheny National Forest, Sheffield Ranger District
1985 Gypsy Moth Suppression Project, Development Unit VI
Spray Blocks 65-68, Dimilin Treatment



SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

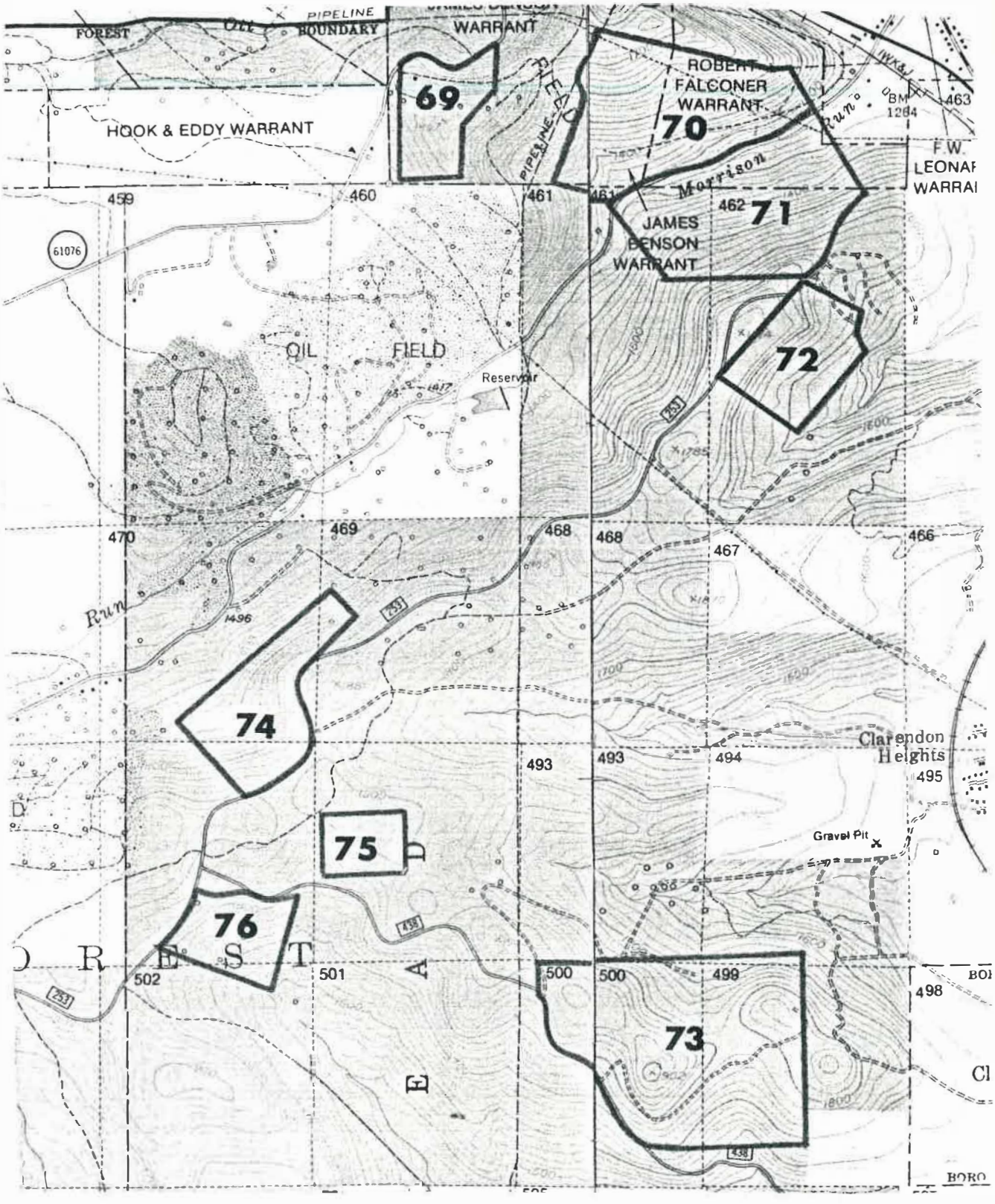
MN GN
7½° 1° 07'
133 MILS 20 MILS

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

LEGEND

- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Trail, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 299 County/Township Road
- 351 Forest Road
- 304 Forest Trail

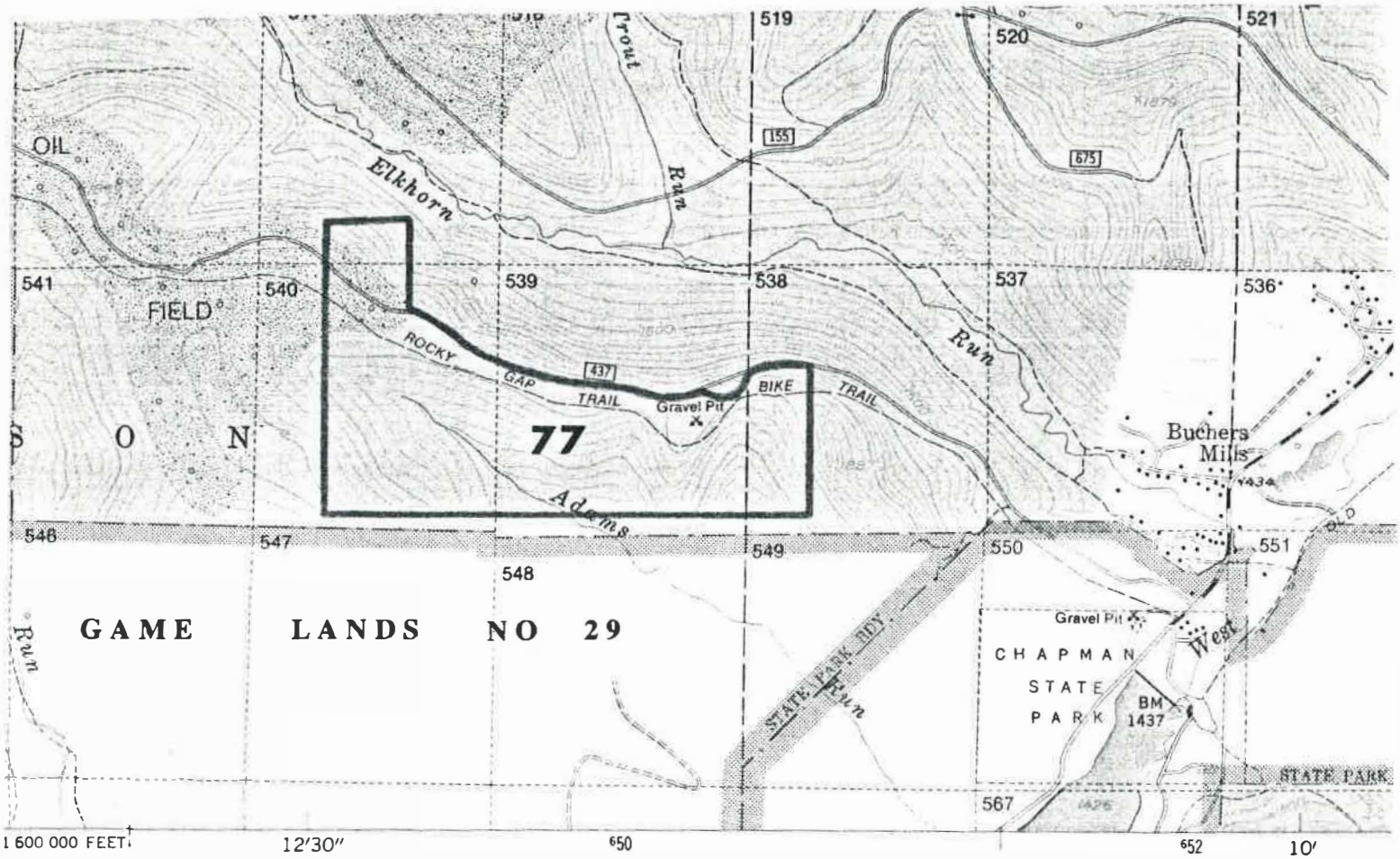
Map 16. Allegheny National Forest, Sheffield Ranger District
1985 Gypsy Moth Suppression Project, Development Unit VI
Spray Blocks 69-72, 74-76, Dimilin Treatment



SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Map 17. Allegheny National Forest, Sheffield Ranger District
1985 Gypsy Moth Suppression Project, Development Unit VI
Spray Block 77, Dimilin Treatment



SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

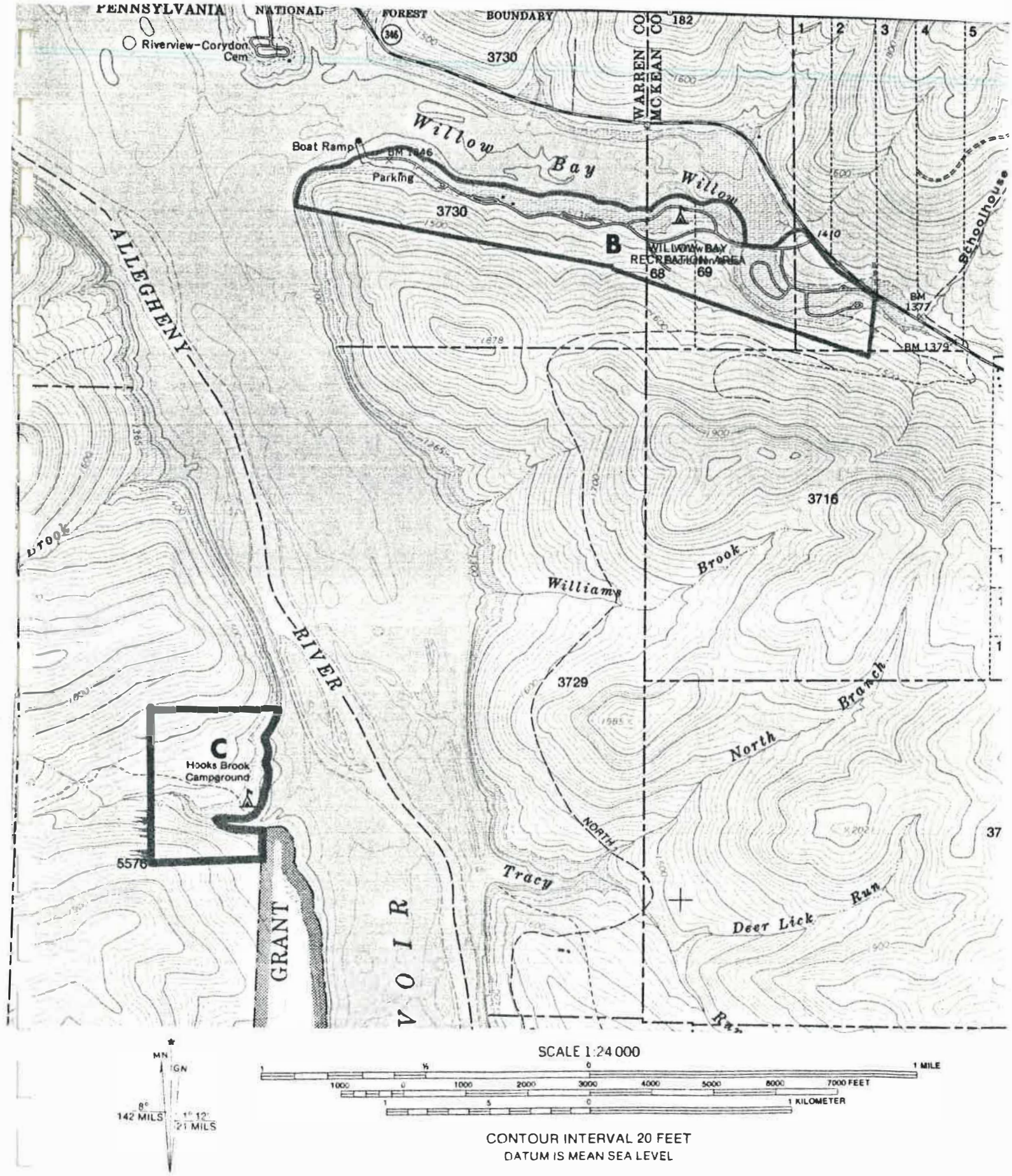
MN
GN
8°
142 MILS
15 13
21 MILS

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

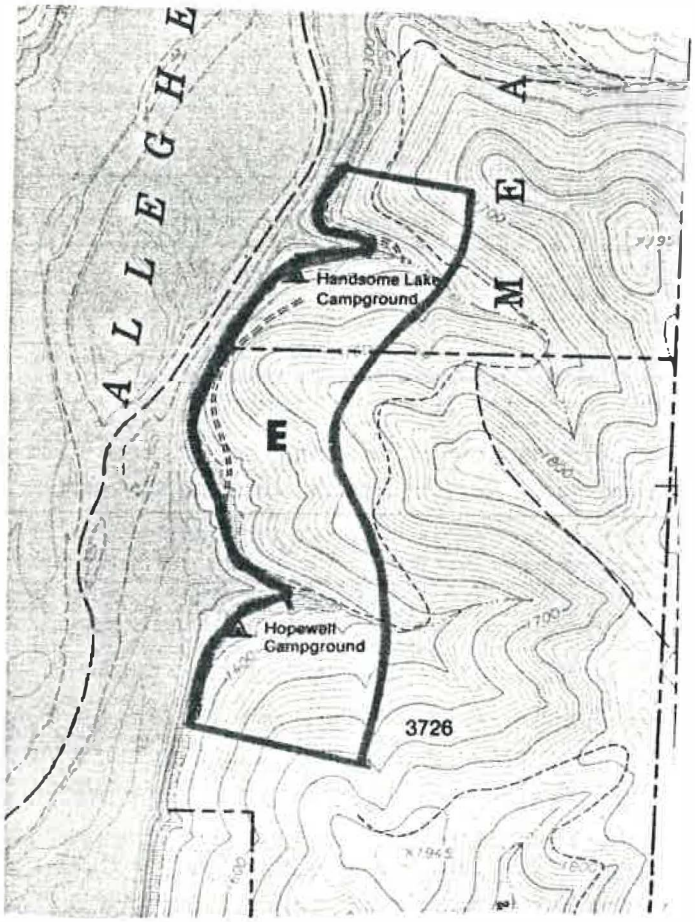
LEGEND

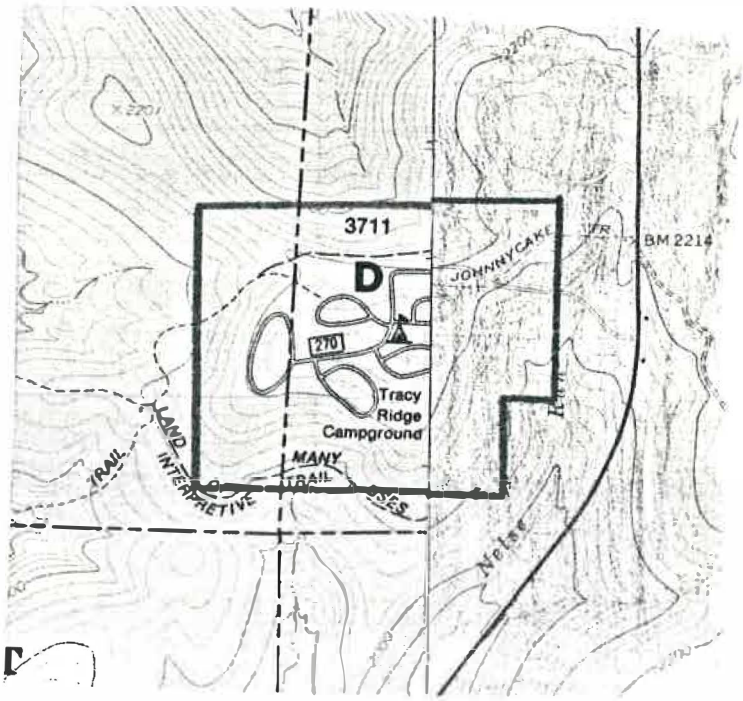
- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Trail, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 399 County/Township Road
- 351 Forest Road
- 304 Forest Trail

Map 18. Allegheny National Forest, Bradford Ranger District
1985 Gypsy Moth Suppression Project, Development Unit VII
Spray Blocks B, C, B.t. Treatment



Map 19. Allegheny National Forest, Bradford Ranger District
1985 Gypsy Moth Suppression Project, Development Unit VII
Spray Blocks D, E, B.t. Treatment





SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

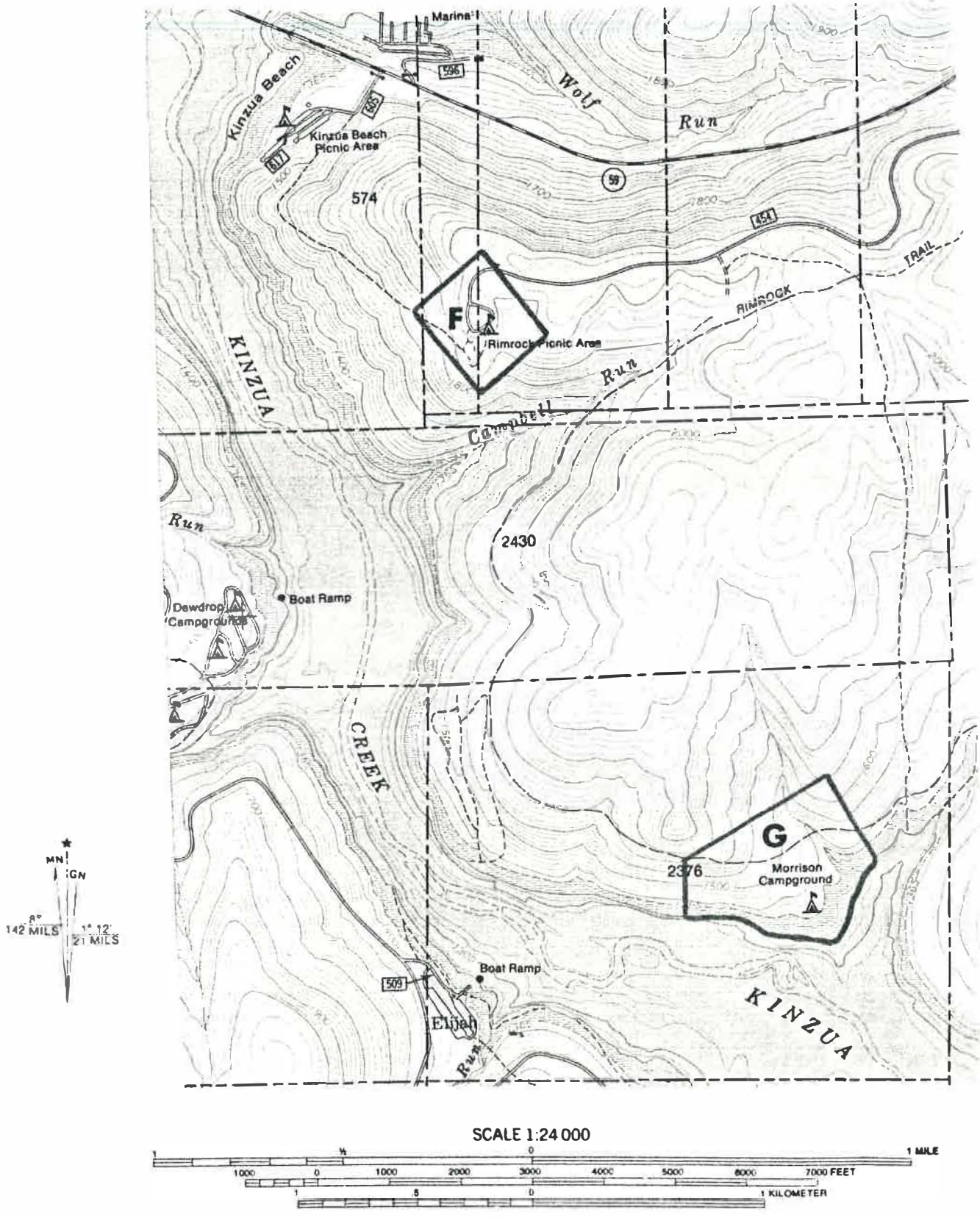
MN GN
7½° 133 MILS 1° 07' 20 MILS

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

LEGEND

- National Forest Boundary
- National Forest Land as of 1982
- Warrant Line, Location Approximate
- Lot Line, Location Approximate
- Road, Location Approximate
- Trail, Location Approximate
- Primary Highway
- Secondary Highway
- Light Duty Road
- Primitive Road
- Trail
- 93 U.S. Highway
- 37 State Highway
- 799 County/Township Road
- 351 Forest Road
- 304 Forest Trail

Map 20. Allegheny National Forest, Bradford Ranger District
1985 Gypsy Moth Suppression Project, Development Unit VII
Spray Blocks F, G, B.t. Treatment



SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL